MCAS

MASSACHUSETTS DEPARTMENT OF EDUCATION

MASSACHUSETTS COMPREHENSIVE ASSESSMENT SYSTEM

Release of Spring 2005 Test Items

Massachusetts Department of Education

This document was prepared by the Massachusetts Department of Education.
Dr. David P. Driscoll, Commissioner of Education

Commissioner's Foreword

Dear Colleagues:

The Massachusetts Comprehensive Assessment System (MCAS) is the Commonwealth's statewide testing program for public school students. Designed to meet the provisions of the Education Reform Law of 1993, MCAS is based exclusively on the learning standards contained in the Massachusetts *Curriculum Frameworks*. The MCAS program was developed with the active involvement of educators from across the state and with the support of the Board of Education. Together, the *Frameworks* and MCAS are continuing to help schools and districts raise the academic achievement of all students in the Commonwealth.

One of the goals of the Department of Education is to help schools acquire the capacity to plan for and meet the accountability requirements of both state and federal law. In keeping with this goal, the Department regularly releases MCAS test items to provide information regarding the kinds of knowledge and skills that students are expected to demonstrate. Local educators are encouraged to use this document together with their school's *Test Item Analysis Reports* as a guide for planning changes in curriculum and instruction that may be needed to ensure that schools and districts make regular progress in improving student perfomance.

This document, which includes all of the test items on which the spring 2005 MCAS student results are based, is available on the Internet at www.doe.mass.edu/mcas/testitems.html. Also available from this site is the new MCAS Question Search tool, which allows interested parties to browse and search through MCAS test items administered to students from 1998 to 2004. New 2005 items will be added later this year.

Thank you for your support as we work together to strengthen education for our students in Massachusetts.

Sincerely,

David P. Driscoll
Commissioner of Education

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I. Document Purpose and Structure

Document Purpose and Structure

Purpose

The purpose of this document is to share with educators and the public all of the test items on which the spring 2005 MCAS student results are based. Local educators will be able to use this information to identify strengths and weaknesses in their curriculum and instruction, and to guide the changes necessary to more effectively meet their students' needs.

This document is also intended to be used by school and district personnel as a companion document to the school- and district-level *Test Item Analysis Reports*. Each school receives a fall 2005 *Test Item Analysis Report* for each content area at each grade level tested (e.g., grade 10 Mathematics). These reports provide data generated from student responses. Each report lists, for the school receiving the report, the names of all enrolled students in the grade covered by the report and shows how each student answered each common item in that report's content area. The report labels each item as multiple-choice, open-response, short-answer, or writing prompt and identifies the item's MCAS reporting category. Item numbers in this document correlate directly to the "Item Numbers" in the *Test Item Analysis Reports*.

Structure

Each subsequent chapter of this document contains information and materials for one MCAS test (one grade level and one content area). For example, chapter II contains information for the Grade 3 Reading Test; chapter IX contains information for the Grade 10 Mathematics Test. Note that chapters III through V contain information for both the ELA Composition (Part A) and the ELA Language and Literature (Part B) tests for the relevant grade.

Beginning with chapter II, each chapter has three main sections. The **first section** introduces the chapter by listing the Massachusetts *Curriculum Framework* content strands assessed by MCAS in that chapter's content area. These content strands are identical to the MCAS reporting categories under which test results are reported to schools and districts. The first section also provides the Internet address for the relevant *Framework* and the page numbers on which the learning standards assessed by the test items in the chapter can be found. In addition, there is a brief overview of the test (number of test sessions, types of items, reference materials allowed, and cross-referencing information).

The **second section** contains the common test items used to generate spring 2005 MCAS student results for that chapter's grade level and content area. With the exception of the ELA Composition writing prompt, the test questions in this document are shown in the same order and basic format in which they were presented in the test booklets. The mathematics reference tools used by students during MCAS Mathematics test sessions (*Mathematics Tool Kit* for grade 4; *Mathematics Reference Sheets* for grades 6, 8, and 10) are inserted immediately following the last question in the second section of each Mathematics chapter. Students in grades 4, 6, and 8 were also provided with plastic rulers. Images of these rulers are not presented in this document.

Due to copyright restrictions, certain English Language Arts reading passages that appear in the printed version of this document are not included in the version available on the Department's Internet site. Copyright information for all common reading passages is provided in both versions of the document.

The **final section** of each chapter is a table that cross-references each common item with its MCAS reporting category and with the *Framework* standard it assesses. Correct answers to multiple-choice questions and, for the Mathematics tests, short-answer questions are also listed in the table.

Responses to open-response items and compositions written in response to writing prompts are scored individually. An overview of procedures for scoring these responses and compositions is presented in the MCAS fact sheet, "Scoring Student Answers to Open-Response Questions and Writing Prompts," which is available on the Department's Internet site at www.doe.mass.edu/mcas. Scoring procedures will also be explained further in the MCAS document, *Guide to Interpreting the Spring 2005 MCAS Reports for Schools and Districts*, due for release in fall 2005. Similar guides are currently available on the Department's Internet site for previous years' MCAS *School Reports* and *District Reports*. Sample student responses and compositions from previous MCAS administrations may also be viewed on the Department's Internet site.

Materials presented in this document are **not** formatted **exactly** as they appeared in Student Test Booklets. For example, in order to present items most efficiently in this document, the following modifications have been made:

▮ Some fonts and/or font sizes may have been changed and/or reduced.

▮ Some graphics may have been reduced in size from their appearance in Student Test Booklets; however, they maintain the same proportions in each case.

▮ The English Language Arts Composition writing prompt is presented on the same page of this document as the make-up writing prompt, and the four lined pages provided for students' initial drafts are omitted.

▮ All references to page numbers in answer booklets have been deleted from the directions that accompany test items.

II. Reading, Grade 3

Reading, Grade 3

The spring 2005 Grade 3 MCAS Reading Test was based on learning standards in the two content strands of the Massachusetts *English Language Arts Curriculum Framework* (2001) listed below. Page numbers for the learning standards appear in parentheses.

❚ Language (*Framework*, pages 19–26)

❚ Reading and Literature (*Framework*, pages 35–64)

The *English Language Arts Curriculum Framework* is available on the Department Web site at www.doe.mass.edu/frameworks/ela/0601.pdf.

In *Test Item Analysis Reports* and on the *Subject Area Subscore* pages of the MCAS *School Reports* and *District Reports*, Grade 3 Reading test results are reported under two MCAS reporting categories: **Language** and **Reading and Literature**, which are identical to the two *Framework* content strands listed above.

Test Sessions and Content Overview

The MCAS Grade 3 Reading Test included three separate test sessions. Each session included selected readings, followed by multiple-choice and open-response questions. Common reading passages and test items are shown on the following pages as they appeared in Grade 3 Test & Answer Booklets. Due to copyright restrictions, certain reading passages cannot be released to the public on the Web site. All of these passages appear in the printed version of this document.

Reference Materials and Tools

The use of bilingual word-to-word dictionaries was allowed for current and former limited English proficient students only, during all three Grade 3 Reading test sessions. No other reference materials were allowed during any Grade 3 Reading test session.

Cross-Reference Information

The table at the conclusion of this chapter indicates each item's reporting category and the *Framework* general standard it assesses. The correct answers for multiple-choice questions are also displayed in the table.

Reading

DIRECTIONS
This session contains one reading selection with eight multiple-choice questions. For multiple-choice questions, mark your answers by filling in the circle next to the best answer.

Three animal friends, Harry Cat, Tucker Mouse, and Chester Cricket, are hiding in some tall grass when Ellen and a group of children walk by. Harry Cat sticks his head out to get a better look. Ellen sees him and decides she wants to meet him. What will Harry do? What will Tucker and Chester do? Read "Ellen" and answer the questions that follow.

Ellen

by George Selden Thompson
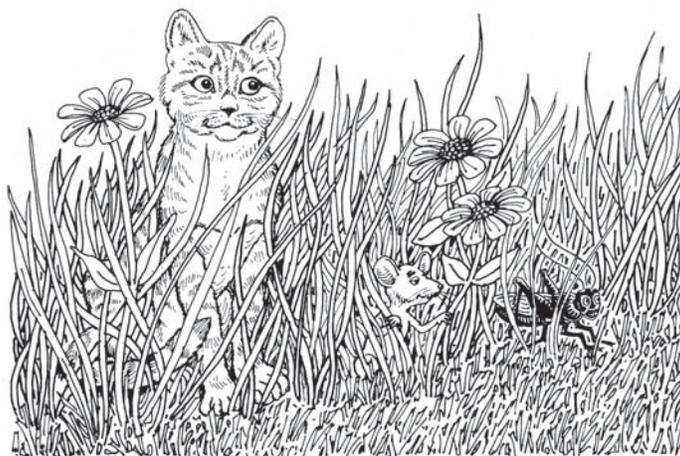
1   Ellen heard the rustling and saw Harry's whiskered face peeking out. "Shh! No one move," she said to the children. "There's the kitty. Now I'm going to take you all home—"

2   "We just got here!" exclaimed Jaspar.

3   "I know," said Ellen. "But it's almost lunchtime anyway. And I'll bring you back this afternoon—I promise! I want to come back by myself and see if I can make friends with the kitty. He'll never come out with Ruff and all of you here. Come on now—please."

4   She led the children up the hill and over to the edge of the road. "Everyone take hands." The children fell into formation—two on each side of her—and all took hands. Ellen took a long look up and down the road. "Quick now—over!"

5   "You, too!" shouted Jaspar at Ruff.

6   And the six of them, Ruff included, hurried across the road. From there, since there were no more roads to cross, the children could find their way home

by themselves. But Ellen came back and sat down again in her Special Place. Sometimes she liked being there alone even more than with the children.

7   "Here, kitty!" she called. "Come on. I won't hurt you."

8   "You made a big hit with her," said Tucker to Harry Cat.

9   "I'm going over and say hello," said Harry. "It'll make her happy."

10   "It'll make *you* happy!" said Tucker Mouse disgustedly. "You're just looking for a little free admiration. Mister Kitty!"

11   Harry padded out over the grass and sat down beside Ellen. "Well, *hello*!" she said, and began stroking Harry's head. "You're a *nice* kitty, aren't you? Yes! You're a *beautiful* kitty!"

12   Tucker Mouse grimaced at Chester. "I wonder what she'd say if she knew that that 'beautiful kitty' lived in a drain pipe in the subway station!"

13   "I don't think it makes any difference where you live," said Chester. "If you're nice, you're nice. And Harry *is* a nice kitty."

14   "Cat! He's a cat!" shouted Tucker Mouse, who was actually a little jealous of all the attention his friend was getting. "Don't use that obnoxious baby talk!" Chester tried not to laugh, and Tucker went on ranting. "Just look at the way he's buttering up to her, arching his head up under her hand like that! And miaowing like a movie star! I never thought I'd see the day!"

15   Ellen had taken Harry into her lap and was stroking his back from his head all the way down to his tail. And, in fact, Harry Cat *was* enjoying the whole thing very much. With each new stroke he let out a loud purr of pleasure.

16   "You have no collar, do you, kitty?" said Ellen. Harry purred. "And I've never seen you in this neighborhood before. Are you lost?" Harry purred. "Would you like to come home with me? I'd fix you up a bed of blankets in my room. And I'd give you all delicious things to eat. Would you like to be my kitty?" Harry purred and rolled over to have his stomach rubbed.

17   "Come on then!" said Ellen. She picked Harry up and began to walk up the hill.

18   "Hey! What's she doing?" shouted Tucker Mouse. "Chester—look! Do something! Stop her! Quick!"

19   "What can I do?" said Chester.

20   "But she's kidnapping Harry Cat!" said Tucker.

21   "He doesn't look too unhappy about it," said the cricket.

22   And that certainly was true. For Harry Cat was lying over one of Ellen's arms, as limp and content as laundry on the line.

Mark your choices for multiple-choice questions 1 through 8 by filling in the circle next to the best answer.

1 Which of the following BEST shows that this story is fiction?

Ⓐ It teaches a lesson.

Ⓑ It tells events in order.

Ⓒ It has animals that talk.

Ⓓ It is about a real person.

2 At the beginning of the story, why does Ellen want Ruff and the children to go home?

Ⓐ She knows the children want to have lunch.

Ⓑ She thinks Harry will come out if they leave.

Ⓒ She believes the children should go home to rest.

Ⓓ She thinks that it is too late for them to walk home alone.

3 According to the story, where is Harry's real home?

Ⓐ a park

Ⓑ a farm

Ⓒ a pet store

Ⓓ a subway station

4 Reread paragraphs 15 and 16. Why does the author repeat *Harry purred* three times?

Ⓐ so the reader knows the sound Harry makes

Ⓑ so the reader knows how happy Harry is

Ⓒ so the reader knows how often Ellen hears Harry

Ⓓ so the reader knows how much Ellen likes Harry

5 In the story, what is the MOST LIKELY reason Ellen thinks she might keep Harry?

Ⓐ She can tell he needs food and water.

Ⓑ She is sure Tucker will not miss him.

Ⓒ She thinks he is lost and has no owner.

Ⓓ She knows that the children will like him.

6 Why is Tucker upset at the end of the story?

Ⓐ Harry is getting a new collar.

Ⓑ Ellen is carrying Harry away.

Ⓒ Chester is making fun of him.

Ⓓ Jaspar and Ruff are coming back.

7 According to the story, how can Chester tell that Harry does not mind going with Ellen?

Ⓐ Harry waves at Chester as he leaves.

Ⓑ Harry goes with her without a struggle.

Ⓒ Harry follows her without looking back.

Ⓓ Harry smiles at Ellen and licks her hand.

Read the sentence from paragraph 4 in the box below.

> The children fell into formation—two on each side of her—and all took hands.

8 What does *formation* mean in the sentence?

Ⓐ the way the children are lined up

Ⓑ the speed the children are walking

Ⓒ the height of the edge of the road

Ⓓ the direction the road turns at the corner

9

Reading

SESSION 2

DIRECTIONS

This session contains three reading selections with sixteen multiple-choice questions and one open-response question. For multiple-choice questions, mark your answers by filling in the circle next to the best answer. For the open-response question, write your answer below the question in the space provided.

From EVERY TIME I CLIMB A TREE by David McCord. Copyright © 1952 by David McCord (Text); Copyright © 1967 by Marc Simont (Illustration). By permission of Little, Brown and Company, Inc.

Is there something special about being up in the branches of a tree? What happens up there? Is a tree the perfect place to be? The speaker in this poem has some answers. Read the poem and answer the questions that follow.

EVERY TIME I CLIMB A TREE

Every time I climb a tree
Every time I climb a tree
Every time I climb a tree
I scrape a leg
5 Or skin a knee
And every time I climb a tree
I find some ants
Or dodge a bee
And get the ants
10 All over me

And every time I climb a tree
Where have you been?
They say to me
But don't they know that I am free
15 Every time I climb a tree?
I like it best
To spot a nest
That has an egg
Or maybe three

20 And then I skin
The other leg
But every time I climb a tree
I see a lot of things to see
Swallows, rooftops and TV
25 And all the fields and farms there be
Every time I climb a tree
Though climbing may be good for ants
It isn't awfully good for pants
But still it's pretty good for me
30 Every time I climb a tree

—*David McCord*

Mark your choices for multiple-choice questions 9 through 12 by filling in the circle next to the best answer.

9 Why does the speaker like to climb a tree?

Ⓐ to take honey from bees

Ⓑ to take eggs from a bird's nest

Ⓒ to get away from the ants' nest

Ⓓ to get a look at the world around

10 What do other people ask when the speaker has been out tree climbing?

Ⓐ Where have you been?

Ⓑ Why do you climb trees?

Ⓒ How did you hurt yourself?

Ⓓ How long have you been gone?

11 What does the speaker MOST enjoy finding while in a tree?

Ⓐ a trail of ants

Ⓑ a beehive full of honey

Ⓒ a nest with eggs in it

Ⓓ a flock of birds sitting on the branches

12 What does the word *spot* mean as it is used in line 17?

Ⓐ move to a better place

Ⓑ hold up as support

Ⓒ mark with dots

Ⓓ find by seeing

12

Imagine being in a bicycle race if you had never raced before! Marshall Taylor did just that about a hundred years ago. He was not the only one surprised by what happened. Read the selection and answer the questions that follow.

Bicycle Rider

by Mary Scioscia

1   About a hundred years ago, a boy named Marshall Taylor got his first job in Mr. Hay's bicycle shop. There was a big bicycle race in Indianapolis each year. On the day of the big race, Mr. Hay asked Marshall to help him sell bicycles at the bicycle track.

2   As this true story begins, Marshall is watching excitedly while more than a hundred bicycle racers gather near the starting line.

3   "Attention everyone! All those in the first one-mile race line up at the starting line," a loud voice called.

4   "First one-mile race?" asked Marshall. "How many races will there be?"

5   "There will be several one-mile races before the main ten-mile race," said Mr. Hay. "Marshall, you just gave me an idea. You should ride in one of the one-mile races. I'll ask the judges if you can," said Mr. Hay.

6   When Mr. Hay came back, he said, "You can ride in the next one-mile race. Pick any of the bikes we brought."

7   At the starting line, Mr. Hay said, "Each time around the track is one lap. Five laps make a mile. Don't worry if you forget how many laps you've gone. When you hear the bell ring, you will know it is the bell lap. That means one lap left to go for the mile."

8   Marshall got on the bicycle and strapped his feet onto the pedals. . . .

9   All the racers leaned over their handlebars. Their helpers held the bicycles steady. The starter raised his starting gun. "One! Two! Three!" the starter shouted. *Bang!*

. . .

10 Around and around the racers went. Now there were seven people ahead of Marshall. *Ding, ding, ding*, the bell rang. Marshall knew that there was one more lap to go for the mile.

11 Marshall speeded up. One racer crossed the finish line . . . two more . . . another. Next was the boy in the red shirt. Right after him came the tall boy. Then Marshall crossed the line. Mr. Hay hurried over to help him stop.

12 "You came in number seven. That's great!" said Mr. Hay.

13 "It wasn't very good," said Marshall. "Six people beat me."

14 "You beat over forty people. You've never been in a race before. You're good enough to try the ten-mile race."

15 "Oh, no," said Marshall. "I could never win that."

16 "No," said Mr. Hay. "You couldn't win, but I think you could finish. Try it, Marshall. If you get tired, just stop. Many racers will drop out before the fifty laps are done."

17 During the last one-mile race, Mr. Hay spoke to the judges again. . . .

18 "Good news," said Mr. Hay, joining Marshall. "You can try the ten-mile race."

19 When the ten-mile race was called, Marshall wheeled his bicycle over to the starting line.

20 "Don't try to go too fast at first," said Mr. Hay. "Just keep up with the others, if you can."

. . .

21 Marshall could feel his heart thumping hard. His hands felt slippery on the handlebars. His legs felt shaky. "One!" shouted the starter. "Two! Three!" *Bang!*

. . .

22 The riders rode in a close pack. Two bicycles bumped, and one fell. Marshall rode around the fallen bicycle and rider.

23 Marshall pulled ahead of the pack. The boy in the red shirt passed him. Three more riders passed him, then two more.

24 Marshall could hear the crowd cheering. It was hard to know who was ahead, because the riders kept going around and around the track. . . .

25 Marshall's mouth tasted dusty. "I want to drop out," he thought. "I can't make the halfway mark."

26 Someone shouted, "Hooray for Marshall Taylor!" It made Marshall feel stronger. "Maybe I can finish a few more laps," he thought.

27 His bicycle went faster and faster around the track. His wet shirt stuck to his back, and his back hurt from being bent over. His legs hurt, too.

28 The people in the crowd stamped their feet and cheered. Marshall heard Mr. Hay, standing at the edge of the track, shout, "Last lap coming up next!"

29   Marshall pushed as hard as he could. The wheels seemed to say, "Got to finish, got to finish."

30   Marshall speeded over the finish line. His bicycle was going so fast he couldn't stop. He went around another lap to slow down.

31   Marshall heard the crowd shout something that sounded like, "Marshall Taylor! Marshall Taylor!" Hats flew into the air.

32   Mr. Hay hurried over to Marshall. He hugged him. "You won, Marshall. You won the race!"

33   "Who, me?" asked Marshall.

34   The judges held up their hands to quiet the crowd. Then one shouted, "Marshall Taylor is the winner!"

35   Marshall Taylor became the fastest bicycle rider in the world. . . . He was the first black American to ride in bicycle races that had both black and white racers. From 1896 to 1910, Marshall Taylor raced in the United States and in many other countries. He held both American and world racing titles.

. . .

36   Marshall Taylor was loved by his fans for his riding skills, his fairness, and his good sportsmanship.

Mark your choices for multiple-choice questions 13 through 19 by filling in the circle next to the best answer.

13   Which of the following BEST shows that the selection is a biography?

   Ⓐ   It describes a well-known race.

   Ⓑ   It explains how to ride a bicycle.

   Ⓒ   It is a true story about a famous bicycle rider.

   Ⓓ   It takes place about a hundred years ago.

14   According to the selection, what did Marshall think he was going to do when he went to the bicycle race?

   Ⓐ   look for a new bicycle

   Ⓑ   sell bicycles for Mr. Hay

   Ⓒ   win as many races as he could

   Ⓓ   ask Mr. Hay for a job in a bicycle shop

15   In paragraph 28, why did the people stamp their feet?

   Ⓐ   They wanted to show their alarm.

   Ⓑ   They thought that the riders were going too fast.

   Ⓒ   They were trying to confuse the bicycle racers.

   Ⓓ   They wanted to show their excitement and support.

16   According to the selection, Marshall was about to give up during the ten-mile race. What helped him to keep on going?

   Ⓐ   He heard a voice from the crowd cheer for him.

   Ⓑ   Mr. Hay signaled to him that it was the last lap.

   Ⓒ   He suddenly pulled ahead of several other riders.

   Ⓓ   The pain in his legs and back started going away.

17

17 According to the selection, why did Marshall go around the track one more time after the ten-mile race was over?

Ⓐ to help a fallen rider

Ⓑ to wave to the crowd

Ⓒ to slow his bicycle down

Ⓓ to show how fast he could go

18 According to the selection, why did Marshall Taylor's fans like him?

Ⓐ He was fast, fair, and a good sport.

Ⓑ He held many world racing titles.

Ⓒ He was tall, thin, and good-looking.

Ⓓ He traveled all around the world.

19 In paragraph 35, what does the word *titles* mean?

Ⓐ fans

Ⓑ bicycles

Ⓒ businesses

Ⓓ championships

Write your answer to open-response question 20 in the lined space provided below.

20 According to the selection, Mr. Hay helped Marshall become a bicycle racer. List FOUR things that Mr. Hay did to help Marshall. Use important details from the selection in your answer.

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

How would it be to see an orangutan in the wild? Read "A Day with the Orangutans" *to find out. Answer the questions that follow.*

A DAY WITH THE ORANGUTANS

by Jeannie W. Berger

Students read a selection titled "A Day with the Orangutans" and then answered questions 21 through 25 that follow on the next pages of this document.

Due to copyright restrictions, the selection cannot be released to the public over the Internet. However, the selection is printed in the publication *Release of Spring 2005 Test Items*, which has been sent to schools and libraries across the state. For more information, see the copyright citation below.

Mark your choices for multiple-choice questions 21 through 25 by filling in the circle next to the best answer.

21 According to the selection, what is the first sign that an orangutan is nearby?

Ⓐ the scent of an animal

Ⓑ the sound of a tree shaking

Ⓒ an orangutan mom calling her baby

Ⓓ an orangutan swinging in the trees

22 What does the author of the selection say to do if the reader sees a baby orangutan in the wild?

Ⓐ have a camera ready

Ⓑ leave some food nearby

Ⓒ make friends with its mother

Ⓓ just watch without getting too close

23 According to the selection, why do baby orangutans stay close to their moms for as long as eight years?

Ⓐ Baby orangutans must learn not to be shy.

Ⓑ Baby orangutans love their moms very much.

Ⓒ Their moms need to teach the babies how to live when they are grown.

Ⓓ Their moms do not send the babies away until they are too big for the nest.

21

24 Which phrase from the selection tells what orangutan and human babies do when they lose their tempers?

Ⓐ shake again

Ⓑ throw a tantrum

Ⓒ take a good look

Ⓓ stay close to their moms

25 According to the selection, how does a baby orangutan learn to make its own nest?

Ⓐ It sees other baby orangutans making nests.

Ⓑ It watches its mother make a new nest every night.

Ⓒ It makes play nests with other baby orangutans.

Ⓓ It sleeps in a nest with its mother every night.

Reading

SESSION 3

DIRECTIONS

This session contains three reading selections with sixteen multiple-choice questions and one open-response question. For multiple-choice questions, mark your answers by filling in the circle next to the best answer. For the open-response question, write your answer below the question in the space provided.

Henry and his friend agree that they both want to go to Fitchburg, but they do not agree on the best way to get there. Read Henry Hikes to Fitchburg *to find out what the journey is like for the two friends. After you read the story answer the questions that follow.*

Henry Hikes to Fitchburg

by D. B. Johnson

1   One summer day, Henry and his friend decided to go to Fitchburg to see the country.

2   "I'll walk," said Henry. "It's the fastest way to travel."

3   "I'll work," Henry's friend said, "until I have the money to buy a ticket to ride

the train to Fitchburg. We'll see who gets there first!"

4   His friend waved. "Enjoy your walk," he said.

5   Henry walked down the road to Fitchburg. "Enjoy your work," he called back.

6   Henry's friend filled the woodbox in Mrs. Alcott's kitchen. *10 cents.*

7   Henry hopped from rock to rock across the Sudbury River.

8   His friend swept out the post office. *5 cents.*

9   Henry carved a walking stick. *25 miles to Fitchburg.*

10   Henry's friend pulled all the weeds in Mr. Hawthorne's garden. *15 cents.*

11   Henry put ferns and flowers in a book and pressed them.

12   His friend painted the fence in front of the courthouse. *10 cents.*

13   Henry walked on stone walls.

14   Henry's friend moved the bookcases in Mr. Emerson's study. *15 cents.*

15   Henry climbed a tree. *18 miles to Fitchburg.*

16   His friend carried water to the cows grazing on the grass in town. *5 cents.*

17   Henry made a raft and paddled up the Nashua River.

18   Henry's friend cleaned out Mrs. Thoreau's chicken house. *10 cents.*

19   Henry crossed a swamp and found a bird's nest in the grass. *12 miles to Fitchburg.*

20   His friend carried flour from the mill to the village baker. *20 cents.*

21   Henry found a honey tree.

22   Henry's friend ran to the train station to buy his ticket to Fitchburg. *90 cents.*

23   Henry jumped into a pond. *7 miles to Fitchburg.*

24   His friend sat on the train in a tangle of people.

25   Henry ate his way through a blackberry patch.

26   Henry's friend got off the train at Fitchburg Station just as the sun was setting.

27   Henry took a shortcut. *1 mile to Fitchburg.*

28   His friend was sitting in the moonlight when Henry arrived. "The train was faster," he said.

29   Henry took a small pail from his pack. "I know," he smiled. "I stopped for blackberries."

Mark your choices for multiple-choice questions 26 through 33 by filling in the circle next to the best answer.

26 Which of the following sentences BEST tells what this story is about?

Ⓐ Henry decides to walk to Fitchburg and has many adventures along the way.

Ⓑ Henry's friend wants to go to Fitchburg and decides to earn the money for a train ticket.

Ⓒ Henry and his friend enjoy walking to the railroad station, where they take the train to Fitchburg.

Ⓓ Henry and his friend want to go to Fitchburg, and each decides to get there differently.

27 Where does most of this story take place?

Ⓐ in a village and on a train

Ⓑ in a pond and in the post office

Ⓒ in a town and in the countryside

Ⓓ in front of a courthouse and on a road

28 According to the story, Henry's friend earns money doing all of these EXCEPT

Ⓐ planting a garden.

Ⓑ moving a bookcase.

Ⓒ sweeping the post office.

Ⓓ cleaning a chicken house.

29 According to the story, how much does a train ticket to Fitchburg cost?

Ⓐ 10 cents

Ⓑ 15 cents

Ⓒ 20 cents

Ⓓ 90 cents

Read the sentence from the story in the box below.

> His friend sat on the train in a tangle of people.

30 What does the sentence tell the reader about the train ride?

Ⓐ There were many passengers on the train.

Ⓑ There were not enough train tickets.

Ⓒ Henry's friend got on the wrong train.

Ⓓ Henry's friend could not find his seat on the train.

31 Throughout the story, how does the reader know that BOTH Henry and his friend are getting closer to their goal?

Ⓐ Henry and his friend are glad to see each other at the train station.

Ⓑ Henry jumps into a pond while his friend paddles up the river.

Ⓒ Henry and his friend plan each step of the journey together.

Ⓓ Henry has fewer miles to travel while his friend is earning money.

Read the sentence from the story in the box below.

> Henry walked on stone walls.

32 Which word in the sentence is an ADJECTIVE?

Ⓐ Henry

Ⓑ walked

Ⓒ stone

Ⓓ walls

Read the sentence from the story in the box below.

> Henry made a raft and paddled up the Nashua River.

33 Which word means ALMOST THE SAME as *raft* as it is used in the sentence?

Ⓐ boat

Ⓑ cap

Ⓒ map

Ⓓ wagon

Write your answer to open-response question 34 in the lined space provided below.

34   In this story, the reader can tell what the characters are like through their actions. Read the sentences in the chart below about Henry and his friend. Complete the chart with examples from the story that support the sentences. Give TWO examples for each character.

Henry **enjoys the outdoors.**	**For example:** **He hops on rocks to get across a river.**
	1.
	2.
Henry's friend **is hard working.**	**For example:** **Mr. Hawthorne hires him to pull weeds.**
	1.
	2.

The games children play today have changed from the games children played long ago. This selection explains how some games were played. It also explains how some have changed. Read the selection. Use information from the selection to answer the questions that follow.

Schoolyard toys

1 At school, children were allowed to play during recess and lunchtime. Many brought toys to school so they could share them with their friends. Hoops, marbles, jacks, and tops were all favorite schoolyard toys.

Marbles

2 Marbles were made of stone, pottery, clay, or china. Some had colorful swirls or strange designs. Children who had no marbles used musketballs, nuts, or hard berries to play instead.

3 Marble collections were always changing, as children won, lost, and traded their marbles. A big bag of marbles was considered a treasure. Losing at marbles was very disappointing. Perhaps the expression "lost their marbles" began as a description of an angry loser!

Jacks

4 The game of jacks was played with small, six-pronged objects called **jackstones**, or **jacks**. The first player started the game by throwing the jackstones on the ground. The other players then took turns tossing one jack into the air, picking up another jack from the ground, and then catching the flying jack as it came back down—all with the same hand!

5 In the next rounds, players tried to grab two jacks, then three, then four. If someone failed to pick up enough jacks, or allowed the flying jack to hit the ground, that person was out of the game. In the late 1800s, players bounced a rubber ball instead of throwing a jack in the air.
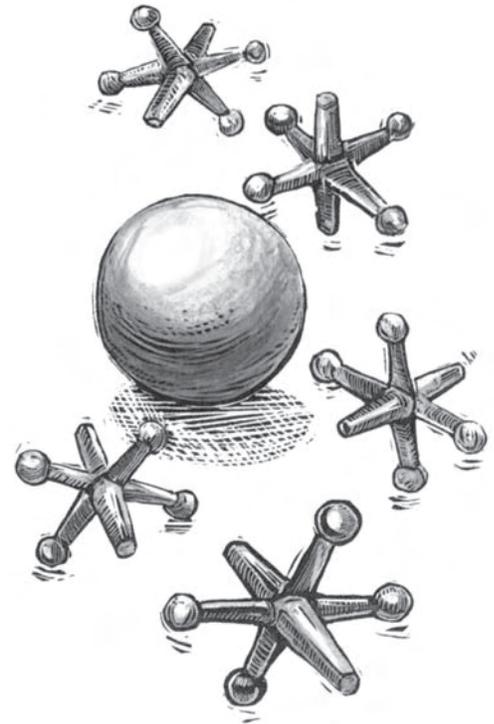
Jacks, played with or without a rubber ball, was a favorite schoolyard game. It required skill and good reflexes.

Tops

6 Tops were favorite toys with both boys and girls. They came in many different styles. Some were wound up with a string. Others had a long, round stem for spinning. **Peg tops** were the most common kind of top. They were made of a single carved piece of wood. A **humming top** was hollow and had a hole in one side. When it spun, it made a whistling or humming noise.

. . .

Hoops

7 A wooden or metal hoop could provide hours of fun. Boys and girls raced their hoops across the schoolyard. In order to keep the hoops upright, children guided them with a stick. Contests were held to test hoop-rolling skills. Sometimes participants had to guide their hoops through obstacle courses. In other contests, children tried to keep several hoops rolling at once.
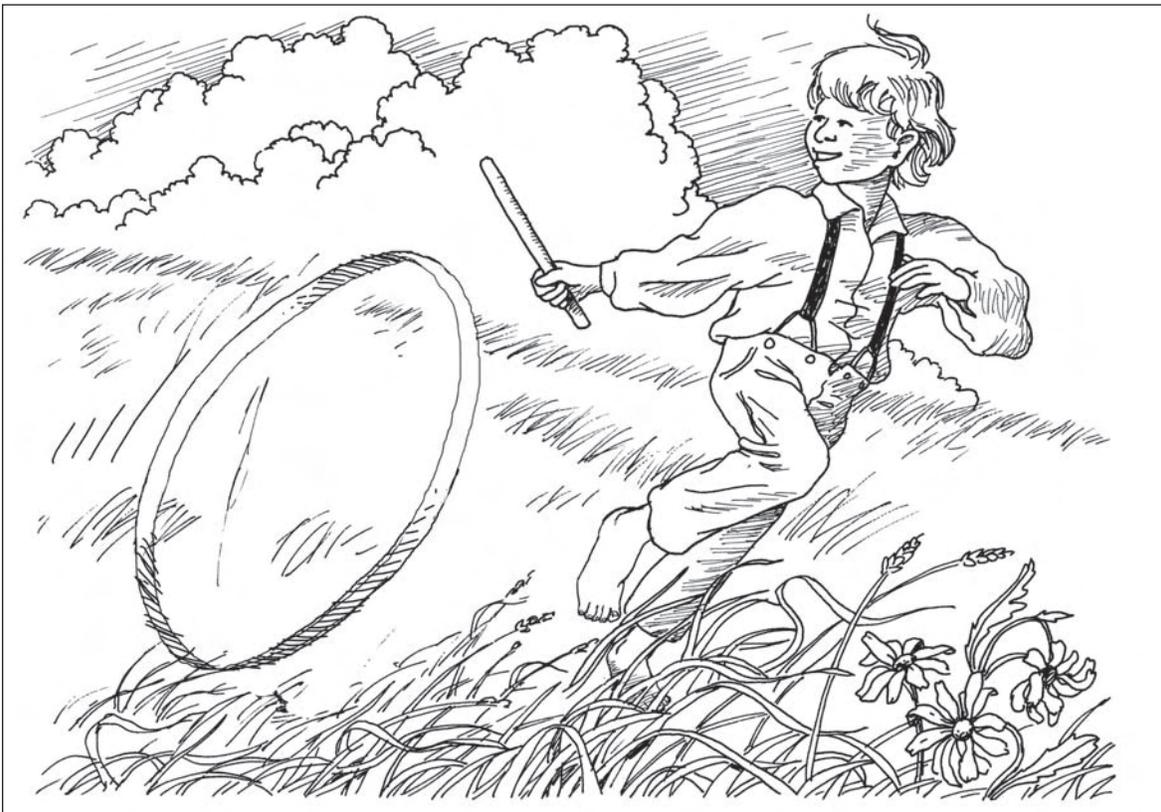
The village cooper made hoops to hold his barrels together.
When a barrel wore out, children used the hoops for their games.

Mark your choices for multiple-choice questions 35 through 38 by filling in the circle next to the best answer.

35 What is the MAIN IDEA of this selection?

Ⓐ Marble collections were always changing.

Ⓑ Boys and girls had hoop-racing contests at school.

Ⓒ Hoops, marbles, jacks, and tops used to be popular with children.

Ⓓ Children brought tops and jacks to school to share with their friends.

36 According to the selection, what would cause a player to lose in the game of jacks?

Ⓐ using only one hand

Ⓑ not picking up enough jacks

Ⓒ throwing the ball up too high

Ⓓ not tossing up all of the jacks

37 What is paragraph 6 MOSTLY about?

Ⓐ different kinds of tops

Ⓑ how tops were wound up with string

Ⓒ the most common kind of top

Ⓓ how tops make noise

Read the sentence in the box below.

> In order to keep the hoops upright, children guided them with a stick.

38 According to the selection, the children kept the hoop *upright* so that it would

Ⓐ flip.

Ⓑ bounce.

Ⓒ keep rolling.

Ⓓ start humming.

This story is about a turtle who wants to go south for the winter. Will he get there? Read the story to see what happens. Use what you read to answer the questions that follow.

How Turtle Flew South for the Winter

by Joseph Bruchac

1   It was the time of year when the leaves start to fall from the aspens.

2   Turtle was walking around when he saw many birds gathering together in the trees. They were making a lot of noise and Turtle was curious. "Hey," Turtle said, "What is happening?"

3   "Don't you know?" the birds said. "We're getting ready to fly to the south for the winter."

4   "Why are you going to do that?" Turtle said.

5   "Don't you know anything?" the birds said. "Soon it's going to be very cold here and the snow will fall. There won't be much food to eat. Down south it will be warm. Summer lives there all of the time and there's plenty of food."

6   As soon as they mentioned the food, Turtle became even more interested. "Can I come with you?" he said.

7   "You have to fly to go south," said the birds. "You are a turtle and you can't fly."

8   But Turtle would not give up. "Isn't there some way you could take me along?" He begged and pleaded. Finally the birds agreed just to get him to stop asking.

9   "Look here," the birds said, "can you hold onto a stick hard with your mouth?"

10   "That's no problem at all," Turtle said. "Once I grab onto something no one can make me let go until I am ready."

11   "Good," said the birds. "Then you hold on hard to this stick. These two birds here will each grab one end of it in their claws. That way they can carry you along. But remember, you have to keep your mouth shut!"

12   "That's easy," said Turtle. "Now let's go south where Summer keeps all that food." Turtle grabbed onto the middle of the stick and two big birds came and grabbed each end. They flapped their wings hard and lifted Turtle off the ground. Soon they were high in the sky and headed toward the south.

13   Turtle had never been so high off the ground before, but he liked it. He could look down and see how small everything looked. But before they had gone too far, he began to wonder where they were. He wondered what the lake was down below him and what those hills were. He wondered how far they had come and how far they would have to go to get to the south where Summer lived. He wanted to ask the two birds who were carrying him, but he couldn't talk with his mouth closed.

14   Turtle rolled his eyes. But the two birds just kept on flying. Then Turtle tried waving his legs at them, but they acted as if they didn't even notice. Now Turtle was getting upset. If they were going to take him south, then the least they could do was tell him where they were now! "Mmmph," Turtle said, trying to get their attention. It didn't work. Finally Turtle lost his temper.

15   "Why don't you listen to . . ." but that was all he said, for as soon as he opened his mouth to speak, he had to let go of the stick and he started to fall. Down and down he fell, a long, long way. He was so frightened that he pulled his legs and his head in to protect himself! When he hit the ground he hit so hard that his shell cracked. He was lucky that he hadn't been killed, but he ached all over. He ached so much that he crawled into a nearby pond, swam down to the bottom and dug into the mud to get as far away from the sky as he possibly could. Then he fell asleep and he slept all through the winter and didn't wake up until the spring.

16   So it is that today only the birds fly south to the land where Summer lives while turtles, who all have cracked shells now, sleep through the winter.
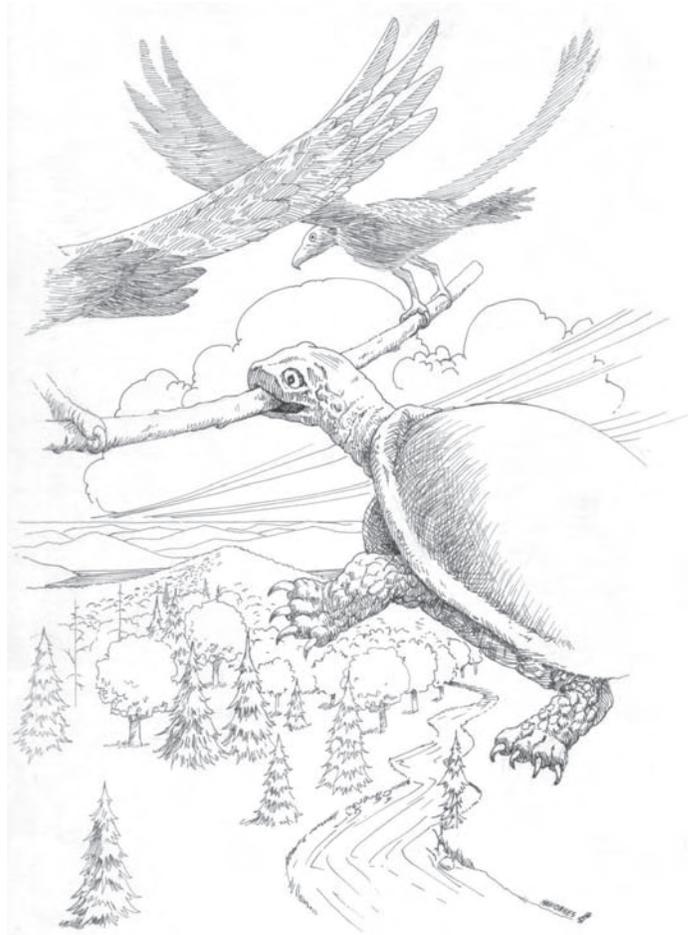
Mark your choices for multiple-choice questions 39 through 42 by filling in the circle next to the best answer.

39 According to the story, Turtle wants to go south MOSTLY because he wants to

   Ⓐ be with the birds.

   Ⓑ have food to eat.

   Ⓒ see what it is like to fly.

   Ⓓ visit a new place.

40 In the story, Turtle learns that bad things can happen when he

   Ⓐ sleeps too long.

   Ⓑ always stays home.

   Ⓒ has mean friends.

   Ⓓ loses his temper.

41 According to the story, what does Turtle do AFTER he lands on the ground?

   Ⓐ He crawls all the way back to his home.

   Ⓑ He pulls his legs and head into his shell to hide.

   Ⓒ He yells up at the birds to listen to him.

   Ⓓ He goes to sleep in the muddy bottom of a pond.

42 According to the story, because of Turtle's fall from the sky all turtles now

   Ⓐ have cracked shells.

   Ⓑ know how to swim.

   Ⓒ hide inside their shells.

   Ⓓ have strong, hard backs.

Grade 3 Reading
Spring 2005 Released Items:
Reporting Categories, Standards, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC)*
1	8	*Reading and Literature / Genre*	10	C
2	8	*Reading and Literature / Fiction*	12	B
3	8	*Reading and Literature / Understanding a Text*	8	D
4	8	*Reading and Literature / Style and Language*	15	B
5	9	*Reading and Literature / Fiction*	12	C
6	9	*Reading and Literature / Understanding a Text*	8	B
7	9	*Reading and Literature / Understanding a Text*	8	B
8	9	*Language / Vocabulary and Concept Development*	4	A
9	12	*Reading and Literature / Poetry*	14	D
10	12	*Reading and Literature / Poetry*	14	A
11	12	*Reading and Literature / Poetry*	14	C
12	12	*Language / Vocabulary and Concept Development*	4	D
13	17	*Reading and Literature / Genre*	10	C
14	17	*Reading and Literature / Understanding a Text*	8	B
15	17	*Reading and Literature / Nonfiction*	13	D
16	17	*Reading and Literature / Nonfiction*	13	A
17	18	*Reading and Literature / Understanding a Text*	8	C
18	18	*Reading and Literature / Understanding a Text*	8	A
19	18	*Language / Vocabulary and Concept Development*	4	D
20	19	*Reading and Literature / Nonfiction*	13	
21	21	*Reading and Literature / Nonfiction*	13	B
22	21	*Reading and Literature / Nonfiction*	13	D
23	21	*Reading and Literature / Understanding a Text*	8	C
24	22	*Language / Vocabulary and Concept Development*	4	B
25	22	*Reading and Literature / Nonfiction*	13	B
26	26	*Reading and Literature / Understanding a Text*	8	D
27	26	*Reading and Literature / Fiction*	12	C
28	26	*Reading and Literature / Fiction*	12	A
29	26	*Reading and Literature / Understanding a Text*	8	D
30	27	*Reading and Literature / Style and Language*	15	A
31	27	*Reading and Literature / Fiction*	12	D
32	27	*Language / Structure and Origins of Modern English*	5	C
33	27	*Language / Vocabulary and Concept Development*	4	A
34	28	*Reading and Literature / Fiction*	12	
35	31	*Reading and Literature / Understanding a Text*	8	C
36	31	*Reading and Literature / Nonfiction*	13	B
37	31	*Reading and Literature / Understanding a Text*	8	A
38	31	*Language / Vocabulary and Concept Development*	4	C
39	34	*Reading and Literature / Myth, Traditional Narrative, and Classical Literature*	16	B
40	34	*Reading and Literature / Theme*	11	D
41	34	*Reading and Literature / Understanding a Text*	8	D
42	34	*Reading and Literature / Myth, Traditional Narrative, and Classical Literature*	16	A

* Answers are provided here for multiple-choice items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.

III. English Language Arts, Grade 4

A. Composition
B. Language and Literature

Grade 4 English Language Arts Test

Test Structure

The Grade 4 MCAS English Language Arts Test was presented in the following two parts:

▌ the ELA Composition Test, which used a writing prompt to assess learning standards from the Massachusetts *English Language Arts Curriculum Framework's* **Composition** strand

▌ the ELA Language and Literature Test, which used multiple-choice and open-response questions (items) to assess learning standards from the *Curriculum Framework's* **Language** and **Reading and Literature** strands

A. Composition

The spring 2005 Grade 4 MCAS English Language Arts Composition Test and Make-Up Test were based on learning standards in the **Composition** strand of the Massachusetts *English Language Arts Curriculum Framework* (2001). The learning standards for the Composition strand appear on pages 72–83 of the *Framework*, which is available on the Department Web site at www.doe.mass.edu/frameworks/ela/0601.pdf.

In *Test Item Analysis Reports* and on the *Subject Area Subscore* pages of the MCAS *School Reports* and *District Reports*, ELA Composition test results are reported under the **Composition** reporting category.

Test Sessions and Content Overview

The MCAS ELA Composition Test included two separate test sessions, administered on the same day with a short break between sessions. During the first session, each student wrote an initial draft of a composition in response to the appropriate writing prompt on the next two pages. During the second session, each student revised his/her draft and submitted a final composition, which was scored in the areas of Topic Development and Standard English Conventions. The MCAS Writing Score Guide (Composition Grade 4) is available at www.doe.mass.edu/MCAS/student/2004/scoring4.doc.

Reference Materials and Tools

At least one English-language dictionary per classroom was provided for student use during ELA Composition test sessions. The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only. No other reference materials or tools were allowed during either ELA Composition test session.

Cross-Reference Information

Framework general standards 19–22 are assessed by the ELA Composition.

Grade 4 Writing Prompt

WRITING PROMPT

Think about a time you tried something new. Maybe it was your first day of school, your first time on a bike or bus, the first time you tried a skill learned in class, or the first time you tried a new sport.

Write a story about when you did something for the first time. Give enough details to show the reader what happened.

You may use the space below to plan what you are going to write (notes, outlines, other pre-writing activities).

Grade 4 Make-Up Writing Prompt

WRITING PROMPT

Think about a special day you had at school. Perhaps you won an award, went on a field trip, played a fun game, or learned something really interesting.

Write a story about this special day at school. Give enough details to show the reader what happened, and why it made the day special.

You may use the space below to plan what you are going to write (notes, outlines, other pre-writing activities).

B. Language and Literature

The spring 2005 Grade 4 MCAS English Language Arts Language and Literature Test was based on learning standards in the two content strands of the Massachusetts *English Language Arts Curriculum Framework* (2001) listed below. Page numbers for the learning standards appear in parentheses.

❙ Language (*Framework*, pages 19–26)

❙ Reading and Literature (*Framework*, pages 35–64)

The *English Language Arts Curriculum Framework* is available on the Department Web site at www.doe.mass.edu/frameworks/ela/0601.pdf.

In *Test Item Analysis Reports* and on the *Subject Area Subscore* pages of the MCAS *School Reports* and *District Reports*, ELA Language and Literature test results are reported under two MCAS reporting categories: **Language** and **Reading and Literature**, which are identical to the two *Framework* content strands listed above.

Test Sessions and Content Overview

The MCAS Grade 4 ELA Language and Literature Test included three separate test sessions. Each session included selected readings, followed by multiple-choice and open-response questions. Common reading passages and test items are shown on the following pages as they appeared in test booklets. Due to copyright restrictions, certain reading passages cannot be released to the public on the Web site. All of these passages appear in the printed version of this document.

Reference Materials and Tools

The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only, during all three ELA Language and Literature test sessions. No other reference materials were allowed during any ELA Language and Literature test session.

Cross-Reference Information

The table at the conclusion of this chapter indicates each item's reporting category and the *Framework* general standard it assesses. The correct answers for multiple-choice questions are also displayed in the table.

English Language Arts

LANGUAGE AND LITERATURE: SESSION 1

DIRECTIONS
This session contains three reading selections with sixteen multiple-choice questions and two open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

Earl Weber lived on a small farm during the Great Depression, a time when many people in the United States did not have jobs or much money. Read how the Weber family lived through these hard times. Answer the questions that follow.

Our family poses in front of the barn after returning from church. My brother and sister stand on a barrel, which will become the support for a seesaw later in the morning.
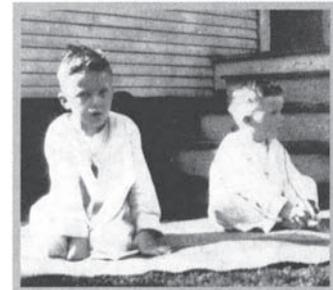
My younger brother (right) and I model nightgowns that Momma made from feed sacks.

Waste Not, Want Not

By Earl M. Weber

1   When I was growing up in the 1930s, the period of the Great Depression, I didn't think of our family as poor, even though we never seemed to have money. I lived on a small farm in Pennsylvania with my parents, two older sisters, and younger brother. We had an old horse, a cow, a few pigs, a flock of chickens, and a big garden. Food was not a problem. We had our own supply of milk, meat, eggs, fresh vegetables, and Momma's homemade bread. But money was scarce.

2   On Sunday mornings, Momma would give each of us two pennies for our Sunday School offerings. Carefully knotting my two cents in the corner of a handkerchief, she would hand it to me and caution me to "be careful not to lose it." Today, two pennies won't buy much of anything, but in the 1930s every penny was important.

3   As a boy of nine, I had only a vague idea of what it meant to live during hard times. The weekly newspaper would

41
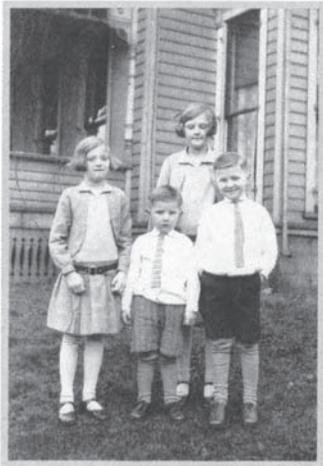
The four of us dressed up for Sunday School on a spring morning. We had to wear garters, which were a nuisance, to hold up our long stockings.

carry pictures of people standing in line for bread, and the evening newscast on our tabletop Crosley radio would tell about the huge number of jobless people and their hardships. But these reports referred to people in the cities, and we lived in the country. We never went to bed hungry, and we didn't stand in line for bread.

4   Although my father was fortunate to have a job at the feed mill, his salary of eighteen dollars a week was barely enough to pay the farm mortgage and the electric bill, and to buy necessities like the flour and yeast Momma needed to bake her bread.

5   Momma earned a few dollars baking pies and bread, which she sold at the local market. Twenty cents for a pie and ten cents for a loaf of bread! Sometimes I helped at the market, and if we had a good day, Momma would give me a nickel for an ice-cream cone.

6   Momma used the market money to buy clothing for the family. With four children and two adults to clothe, she seldom bought anything new. One day when I walked to the mailbox at the end of our lane, I was excited to see a package from Sears, Roebuck and Company. That usually meant new clothing for one of us. As it turned out, I was the lucky one this time, with a brand-new pair of brown tweed knee-length knickers. Although we always went to school looking neat and clean, most of our clothing was patched, darned*, or mended. So to me, a new pair of knickers was very special.

7   Christmas was special, too, because then we got new socks, and for a little while we wouldn't have to wear socks darned in the toes and heels.

8   Momma made some of our clothing, using a treadle (foot-powered) sewing machine. To make nightgowns, she used the muslin sacks that our chicken feed came in. I wore a nightgown with "PRATT'S CHICKEN FEED" printed in big black letters on the front. (It wasn't until years later when my high-school class went on an overnight trip that I got my first store-bought pajamas.) Some companies actually put their feed in sacks made of colorfully patterned calico. Momma liked this material for making aprons and dresses.

9   When a piece of clothing was worn out, it wasn't thrown away. First, all the buttons were removed, sorted by size and color, and put in cans or glass jars. Then the clothing was examined, and the best parts were cut into strips and saved for making rugs.

* *darned* — repaired with thread or yarn

10   Almost nothing in our house was thrown away. Store parcels were generally tied with string. We saved this string by winding it on a ball. One of my jobs was to wash and flatten used tin cans. We nailed these pieces of tin over holes in the barn roof to stop the leaks and over holes in the corncrib to stop the mice and rats from eating the corn.

11   A wooden crate was considered a real prize. We would take it apart for future projects, being careful not to split the boards. We even straightened the bent nails and stored them in a tin can.

12   Although we tend to think of recycling as something fairly new, in the 1930s it was part of everyday life. "Waste not, want not" was a familiar and often repeated phrase during those Depression years.

Yesterday and Today

In the 1930s, a chocolate bar cost five cents. A single-dip ice-cream cone was also five cents. If that sounds good, consider that children living in the country, if they were lucky enough to have a job, earned only ten cents an hour for farm labor. Kids today pay around a dollar for an ice-cream cone and about the same for a chocolate bar. But some can earn five dollars an hour baby-sitting or mowing lawns.

---

1   According to the article, why did many people who lived in the country have enough food during the Great Depression?

    A.   They waited in long bread lines for hours to get food.

    B.   They could buy the food they needed at the feed mill.

    C.   They had plenty of money to buy food at the market.

    D.   They could grow many kinds of food on their farms.

2   According to the article, how did the author's mother help the family?

    A.   She washed and flattened tins to repair holes in the roof.

    B.   She stood in line for bread for the family's food every day.

    C.   She baked pies and bread to sell and made the family's clothes.

    D.   She had a job at the feed mill and grew vegetables.

3   Which word BEST describes the author when he noticed a package in the mailbox?

     A.   proud

     B.   bored

     C.   thrilled

     D.   concerned

4   According to the article, how did the author's mother use feed sacks?

     A.   She mended socks with them.

     B.   She repaired leaks in the roof with them.

     C.   She patched holes in the corncrib with them.

     D.   She made nightgowns, dresses, and aprons with them.

5   According to the article, when did the author get his first pair of store-bought pajamas?

     A.   in high school

     B.   at the age of nine

     C.   on Christmas morning

     D.   on the day the package came

6   In paragraph 10, what does the author MOST LIKELY mean when he says, "Almost nothing in our house was thrown away"?

     A.   The family used very little.

     B.   The family sold things they made.

     C.   The family ate everything they grew.

     D.   The family reused almost everything.

7 According to the article, how much did a child earn working on a farm in the 1930s?

    A. five cents an hour

    B. ten cents an hour

    C. one dollar an hour

    D. five dollars an hour

Read the sentence from paragraph 3 in the box below.

> The weekly newspaper would carry pictures of people standing in line for bread, and the evening newscast on our tabletop Crosley radio would tell about the huge number of jobless people and their hardships.

8 Which of the following could replace the word *hardships*?

    A. farms

    B. difficulties

    C. families

    D. savings

Write your answer to open-response question 9 in the space provided in your Student Answer Booklet.

9 Based on the article, describe FOUR ways the author's family benefited from reusing items. Use important and specific information from the article to support your answer.

Have you ever wondered why your shadow seems to come and go? Read to find out how one child feels about his shadow. Answer the questions that follow.

MY SHADOW

I have a little shadow that goes in and out with me,
And what can be the use of him is more than I can see.
He is very, very like me from the heels up to the head;
And I see him jump before me, when I jump into my bed.

5   The funniest thing about him is the way he likes to grow—
Not at all like proper children, which is always very slow;
For he sometimes shoots up taller like an india-rubber ball,
And sometimes gets so little that there's none of him at all.

He hasn't got a notion of how children ought to play,
10   And can only make a fool of me in every sort of way.
He stays so close beside me, he's a coward you can see;
I'd think shame to stick to nursie as that shadow sticks to me!

One morning very early, before the sun was up,
I rose and found the shining dew on every buttercup;
15   But my lazy little shadow, like an arrant sleepy-head,
Had stayed at home behind me and was fast asleep in bed.

—Robert Louis Stevenson

In the public domain.

46

Read line 2 from the poem in the box below.

> And what can be the use of
> him is more than I can see.

10 What does this line mean?

A. The speaker does not know how to talk to his shadow.

B. The shadow does not know how to jump for the speaker.

C. The shadow does not understand how to behave like a child.

D. The speaker does not understand the purpose of his shadow.

11 Based on the poem, what about the shadow is MOST unlike a child?

A. the way he hides

B. the way he grows

C. the way he jumps

D. the way he sleeps

12 Why does the speaker call his shadow a coward in line 11 of the poem?

A. His shadow stays asleep in bed.

B. His shadow stays with him.

C. His shadow imagines how he feels.

D. His shadow shows him how to play.

13 Which of the following lines from the poem is an example of a simile?

A. I have a little shadow that goes in and out with me,

B. For he sometimes shoots up taller like an india-rubber ball,

C. And can only make a fool of me in every sort of way.

D. Had stayed at home behind me and was fast asleep in bed.

The Buddha is a wise teacher. In this story, he tries to help an old woman. As you read this classic story, notice how the Buddha guides the old woman to discover for herself the answer she seeks. As it turns out, she was simply looking for the wrong thing! Answer the questions that follow.

The
Mustard
Seed

Retold by Marilyn McFarlane

1   The Buddha was walking on a dusty country road one day when he stopped at the edge of a river to splash cooling water on his face. When he finished washing, he looked up and saw an old woman kneeling beside him. Her clothes were ragged and her face was worn. Her arms were covered with sores.

2   "Oh, Master," she wailed. "I suffer so. Please help me."

3   "What troubles you?" the Buddha asked, looking at her with compassion in his eyes.

4   "Look at me! See my sad lot!" She touched her rags, and she pointed with skinny fingers to her blistered arms. "I am poor, my clothes are torn, I am ill. Once I was prosperous, with a farm, and now I am old and have only a bowl of rice to eat. Won't you heal me and bring back my riches?"

5   "You have described life as it is," the Buddha answered. "We are all born to suffering."

6   The old woman shook her head, weeping. "No, no, I won't listen. I was not born to suffer."

7   The Buddha saw that she could not understand. "Very well, I will help you," he said. "You must do as I say."

8   "Anything, anything!" she gasped.

9   "Bring me a mustard seed."

10   She stared in astonishment. "Only a mustard seed?"

11   "Yes. But the seed must come from a house that has never known sorrow, trouble, or suffering. I will take the seed and use it to banish all your misery."

12   "Thank you, Master, thank you!"

13   The old woman hobbled away, her bare feet shuffling in the dust. She was on her way to find a house without sorrow. The Buddha continued down the road.

14   Weeks later, he returned along the same road and came to the same place by the river, and there he saw the old woman again. She was scrubbing clothes in the river water and spreading them on rocks to dry in the sun, and while she washed, she sang a tune.

15   "Greetings," the Buddha said. "Have you found the mustard seed?"

16   "No, Blessed One. Every house I visited had far more troubles than I have."

17   "And are you still seeking?"

18   "I'll do that later. I have met so many people who are less fortunate than I, I have to stop and help them. Right now I'm washing clothes for a poor family with sick children." Gently she placed a wet piece of cloth on a rock.

19   The Buddha smiled. He said, "You no longer need the mustard seed. Helping others is a great virtue. You are on the road to becoming a Buddha yourself."

14 What is troubling the old woman in the story?

A. She needs help for her children.

B. She needs rest and warmth.

C. She has too much work to do.

D. She is sick and penniless.

15 In the story, what does the Buddha mean by the phrase "We are all born to suffering"?

A. All people must face hard times in life.

B. All people should ask for help with sorrow.

C. All people should look for ways to be happy.

D. All people must help others whenever possible.

16 Which of the following BEST describes the Buddha in the story?

A. a leader who has difficulty answering questions

B. a traveler who avoids talking to people along his way

C. a guide to help the old woman find out what life is like

D. a friend of the old woman from the time she was rich and healthy

17 What does the Buddha teach the old woman in the story?

A. how to plant seeds

B. how to find happiness

C. how to forgive others

D. how to regain her farm

Write your answer to open-response question 18 in the space provided in your Student Answer Booklet.

18   Explain what the old woman learns in this story. Use important and specific information from the story to support your answer.

English Language Arts
Language and Literature: Session 2

DIRECTIONS
This session contains one reading selection with eight multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

This story is told by Nicodemus, the leader of the rats of NIMH. Read as he describes how he and the other rats were surprised one day at the marketplace. Pay attention as the seemingly calm events lead to a thrilling end. Answer the questions that follow.

The Marketplace
from *Mrs. Frisby and the Rats of NIMH*

by Robert C. O'Brien

1   . . . It was called the Farmers' Market, a great square of a place with a roof over part of it and no walls to speak of. There early every morning the farmers arrived from all over the surrounding countryside, with trucks full of tomatoes, corn, cabbages, potatoes, eggs, chickens, hams, food for the city. One part of it was reserved for the fishermen who brought crabs and oysters and bass and flounders. It was a fine place, noisy and full of smells.

2   We lived near this market—my father, my mother, my nine sisters and brothers and I—underground in a big pipe that had once been part of a storm sewer, but was no longer used. There were hundreds of other rats in the neighborhood. It was a rough life, but not so hard as you might think, because of the market.

3   Every evening at five o'clock the farmers and the fishermen would close up their stalls, pack their trucks, and go home. At night, hours later, the cleanup men would arrive with brooms and hoses. But in between, the market was ours. The food the farmers left behind! Peas and beans that fell from the trucks, tomatoes and squashes, pieces of meat and fish trimmed as waste—they lay on the sidewalks and in the gutters; they filled great cans that were supposed to be covered but seldom were. There was always ten times more than we could eat, and so there was never any need for fighting over it.

4   Fighting? Quite the contrary, the marketplace was a perfect place for playing, and so we did, the young rats at least, as soon as we had finished eating. There were empty boxes for hide-and-seek, there were walls to climb, tin cans to roll, and pieces of twine to tie and swing on. There was even, in the middle of the square, a fountain to swim in when the weather was hot. Then, at the first clang of the cleanup men in the distance, one of the older rats would sound a warning, and everyone would pick up as much food as he could to carry home. All of us kept a reserve supply, because some days—Sundays and holidays—the market would be closed, and we were never quite sure when this would happen.

5   When I went to the market, it was usually with two companions, my older brother Gerald and a friend of ours named Jenner. These were my two closest friends; we liked the same games, the same jokes, the same topics of conversation—even the same kinds of food. I particularly admired Jenner, who was extremely quick and intelligent.

6   One evening in early fall Jenner and I set out for the marketplace. It must have been September, for the leaves were just turning yellow and some children were throwing a football in a vacant lot. Gerald had to stay home that night; he had caught a cold, and since the air was chilly, my mother thought he should not go out. So Jenner and I went without him. I remember we promised to bring him back some of his favorite food, beef liver, if we could find any.

7   We took our usual route to the market, not along the streets but through the narrow walkways between the buildings, mostly commercial warehouses and garages, that bordered the square. As we walked, we were joined by more rats; at that time of day they converged on the marketplace from all directions. When we reached the square, I noticed that there was a white truck of an odd, square shape parked on the street bordering it, perhaps a block away. I say I noticed it—I did not pay any particular attention to it, for trucks were common enough in that part of town; but if I had, I would have noticed that printed on each side of it were four small letters: NIMH. I would not have known what they were, of course, for at that time neither I nor any of the other rats knew how to read.

8   It was growing dark when we reached the market, but through the dusk we could see that there was an unusually large supply of food—a great mound of it—near the center of the square, away from the roofed-over portion. I suppose that should have served as a warning, but it didn't. I remember Jenner's saying, "They must have had a really busy day," and we ran joyfully toward the pile along with several dozen other rats.

9   Just as we reached the food it happened. All around us suddenly there was shouting. Bright, blinding searchlights flashed on, aimed at us and at the mound of food, so that when we tried to run away from it, we could not see where we were going. Between and behind the lights there were shadows moving swiftly, and as they came toward us I could see that they were men— men in white uniforms carrying nets, round nets with long handles.

10   "Look out!" cried Jenner. "They're trying to catch us." He darted in one direction, I in another, and I lost sight of him.

11   We all ran—straight toward the men with the nets. There was no other way to run; they had us encircled. The nets flailed down, scooped, flailed again. I suppose some rats made it through, slipping between the men and past the lights. I felt a swish—a net just missed me. I turned and ran back toward the mound, thinking I might hide myself in it. But then came another swish, and that time I felt the enveloping fibers fall over me. They entangled my legs, then my neck. I was lifted from the ground along with three other rats, and the net closed around us.

19 The details in paragraph 1 are MOSTLY
used to

A. describe a setting.

B. introduce a character.

C. present the problem.

D. create suspense.

Read the sentence from the story in the box below.

> Then, at the first clang of the
> cleanup men in the distance,
> one of the older rats would
> sound a warning, and everyone
> would pick up as much food as
> he could to carry home.

20 What does this show about the rats?

A. The rats are neat.

B. The rats are silent.

C. The rats are careful.

D. The rats are thankful.

21 Reread paragraph 7 in the story. Based on
this paragraph, what MOST LIKELY
happens to the narrator in the future?

A. He learns how to read.

B. He rescues his friends.

C. He escapes from danger.

D. He returns to the market.

22 Reread paragraph 8 of the story. What
warning do the rats miss?

A. The weather is bad.

B. The market smells funny.

C. The food pile is extra large.

D. The truck races down the street.

23 Reread paragraph 9. Which of the following BEST describes how the rats in the story feel when they see the searchlights?

A. angered

B. confused

C. prepared

D. relieved

24 Which of the following BEST explains what happens to the rats at the end of the story?

A. The rats scare away the men.

B. Many of the rats are saved by the farmers.

C. The rats hide in the mound of food.

D. Many of the rats are caught in the nets.

Read the phrase from the story in the box below.

The food the farmers left behind!

25 Why does the author end this phrase with an exclamation point?

A. to show that the food is scarce

B. to show that the food is spoiled

C. to show that the rats are excited about the food

D. to show that the rats are angry about the wasted food

Read the sentence from paragraph 11 in the box below.

There was no other way to run; they had us encircled.

26 What does *encircled* mean?

A. crowded

B. fooled

C. protected

D. surrounded

Write your answer to open-response question 27 in the space provided in your Student Answer Booklet.

Read the sentence from the story in the box below.

> It was a rough life, but not so hard as you might think, because of the market.

27 Explain how the Farmers' Market makes life easier for the rats that live in the neighborhood. Provide important and specific details from the story to help support your explanation.

English Language Arts

LANGUAGE AND LITERATURE: SESSION 3

DIRECTIONS
This session contains two reading selections with twelve multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

Some insects are able to blend into their surroundings. Read to discover how walking sticks are able to hide—even though they are in plain sight. Pay special attention to the changes that walking sticks experience throughout life. Answer the questions that follow.

STICKS THAT MOVE

by Margo Myler

Students read a selection titled "Sticks That Move" and then answered questions 28 through 35 that follow on the next pages of this document.

Due to copyright restrictions, the selection cannot be released to the public over the Internet. However, the selection is printed in the publication *Release of Spring 2005 Test Items*, which has been sent to schools and libraries across the state. For more information, see the copyright citation below.

28 Reread paragraph 3 of the article. Which of the following is the topic sentence of the paragraph?

A. The smallest species of stick insects lives on the ground.

B. In the United States they're as long as your forefinger.

C. Walking sticks look different depending on where they live.

D. When standing up, they look like blades of grass.

29 Based on the article, which of the following might cause a walking stick to fall on the ground and pretend it is dead?

A. A bird tries to eat the walking stick.

B. A female needs to lay her eggs.

C. A walking stick needs to molt.

D. A young walking stick hatches early.

30 According to the article, what is one way a walking stick defends itself?

A. It sleeps through the winter.

B. It has strong legs for fast movement.

C. It pokes attackers with its prickly legs.

D. It can grow new body parts.

31 According to paragraph 8, what can happen if more eggs than usual survive?

A. The walking sticks can ruin many trees.

B. The walking sticks will scare away attackers.

C. The walking sticks can destroy the nests in trees.

D. The walking sticks will lay fewer eggs the next summer.

32 According to the article, why do young walking sticks shed their outer layer?

A. They get too large for their own skin.

B. They need to protect their unhatched eggs.

C. They are attempting to frighten their attackers.

D. They are trying to blend into their surroundings.

33 How does the reader know that this article is nonfiction?

A. The article has factual information.

B. The article uses real animals to tell a story.

C. The article is a story about nature.

D. The article tells about life long ago.

34 Based on paragraph 10 of the article, what is another way to say *molt*?

A. walk slowly

B. hide out

C. disappear quickly

D. take off

Write your answer to open-response question 35 in the space provided in your Student Answer Booklet.

35 Describe the different stages walking sticks go through from egg to adult. Use important and specific information from the article to support your answer.

Manuel the baker creates wonderful cakes and pies. However, he is very greedy. Manuel wants his neighbor, Pablo, to pay him for enjoying the delicious smells that come from his bakery. When Pablo refuses, Manuel goes to a judge to solve the problem. Read how the judge teaches a lesson in this traditional play from Peru. Answer the questions that follow.

The Baker's Neighbor

by Adele Thane

CHARACTERS

Manuel Gonzales, a baker
Pablo Perez, his neighbor
Carlos, a boy
Ramona
Inez } Carlos' sisters
Isabel
Judge
Three women
Three villagers

(Three women enter right. They come downstage and question the children.)

1st Woman: What's the matter with Manuel?
2nd Woman: Will he be back soon? I want to buy a cake.
3rd Woman: So do I. What happened?
5 **1st Woman:** He looked so angry. Where's he gone?
Girls (*excitedly, ad lib*): He's gone to get the judge! He is angry! He is furious! (*etc.*)
1st Woman: The judge! What for?
10 **Carlos:** He says Pablo will have to pay for smelling his cakes and pies.
2nd Woman (*to Pablo*): He wants you to pay him for doing *that*?

3rd Woman: He can't be serious!

15 **Pablo:** Oh, yes, he is! But I think it's very funny. (*He laughs, and the women join in.*)

1st Woman: It's ridiculous! Everyone who goes by the shop smells his pastry.

2nd Woman: Is he going to take everyone in town 20 to court?

(They are all in gales of laughter when Manuel returns with the judge, followed by several villagers.)

Manuel (*to the judge*): There he is! (*He points to Pablo.*) There's the thief!

25 **Judge:** Calm yourself, Manuel. It has not yet been proved that Pablo is a thief. First he must have a fair trial.

(The judge sits down at the table and motions for two chairs to be placed facing him. Villagers and the 30 *three women gather under the tree and on the patio with the children. They whisper and talk together as they seat themselves.)*

1st Villager: In all my days, I've never heard of a case like this before.

35 **2nd Villager:** How can a man steal the *smell* of anything?

3rd Villager: I'm surprised the judge would even listen to the baker's story. Money for smelling his cakes! How absurd!

40 **2nd Woman:** He sells as much bread and pastry as he can bake. What more does he want?

3rd Villager: Manuel loves money and he figures this is a way to get more of it.

Judge (*rapping table with his gavel*): Quiet, 45 everyone! Court is in session. I am ready to hear Manuel Gonzales, baker, against Pablo Perez, neighbor. I will hear the baker first. Manuel, tell your story.

Manuel (*rising*): This man,
50 Pablo Perez, comes and stands
outside my bakery every day.
Judge: Does he block the way?
Manuel: Not exactly.
Judge: Does he keep other
55 people from going into your
bakery?
Manuel: No, sir but—
Judge: Then what *does* he do?
Manuel: He stands there,
60 looking at my pies and cakes *and
smelling them.*
Judge: That pleases you,
doesn't it?
Manuel: Pleases me! Far from it!
65 Look here, Your Honor—every
night, I mix the flour and knead
the dough and slave over a hot
oven while that shiftless, good-
for-nothing Pablo sleeps. Then
70 he gets up in the morning, fresh
as a daisy, and comes out here to
smell the fine, sweet pastry I've
baked. He takes full value of this
free daily luxury. He acts as if it's
75 his privilege. Now I ask you,
Judge—is it right that I should
work so hard to provide him
with this luxury, without charge?
No! He should pay for it!
80 **Judge:** I see. You may sit down,
Manuel. Now, Pablo Perez, it is
your turn. (*Pablo stands.*) Is it
true that you stand in front of
Manuel's bakery and smell his
85 cakes and pies?

Pablo: I can't help smelling them,
Your Honor. Their spicy
fragrance fills the air.
Judge: Would you say you
90 *enjoy* it?
Pablo: Oh, yes, sir. I am a man
of simple pleasures. Just
the smell of a bakery makes
me happy.
95 **Judge:** But did you ever pay the
baker for this pleasure?
Pablo: Well, no, sir. It never
occurred to me that I had to
pay him.
100 **Judge:** Pablo Perez, you will now
put ten gold pieces on this
table—for Manuel Gonzales.

*(The villagers gasp. Manuel looks
surprised and delighted.)*

105 **Pablo** (*stunned*): Ten gold pieces!
For smelling the air near my own
house?
Judge: Do you have that
amount?
110 **Pablo:** I—I guess so, but it's my
life's savings.
Judge: Where is it?
Pablo: In my house.
Judge: Get it and bring it here.

115 *(Slowly Pablo crosses patio and
exits left. The villagers talk to
each other disapprovingly.)*

1st Villager: The judge shouldn't
make Pablo pay.

120 **1st Woman:** Pablo is an honest man.

2nd Villager: I don't see how the judge could rule in the baker's favor.

125 **3rd Villager:** Why, he's richer than the judge himself.

2nd Woman: And now he's going to get poor Pablo's savings.

3rd Woman: It's not fair!

130 **Judge** (*rapping with his gavel*): Silence in the court!

(*Pablo returns sadly with a purse and puts it on the table before the judge. Manuel, elated, rubs* 135 *his hands together greedily.*)

Manuel (*to the judge*): I knew Your Honor would do the right thing by me. Thank you, Judge. (*He picks up the purse and starts* 140 *to put it into his cash box.*)

Judge (*rising*): Not so fast, Manuel! Empty that purse on the table and count the gold pieces, one by one.

145 **Manuel** (*grinning craftily*): Ah, yes, Your Honor. I must make sure I haven't been cheated. How kind of you to remind me!

(*He empties the purse and begins* 150 *to count, excitedly. The judge watches Manuel as he lovingly fingers each coin.*)

Judge: It gives you great pleasure to touch that gold, doesn't it, 155 Manuel? You *enjoy* it.

Manuel: Oh, I do, I do! . . . Eight . . . nine . . . ten. It's all here, your honor, and none of it false.

160 **Judge:** Please put it back in the purse.

(*Manuel does so.*) Now return it to Pablo.

Manuel (*in disbelief*): Return it! 165 But—but you just told Pablo to pay it to me.

Judge: No, I did not tell him to pay it to you. I told him to put it on this table. Then I instructed 170 you to count the money, which you did. In doing so, you enjoyed Pablo's money—the way he has enjoyed your cakes and pies. In other words, he has smelled your 175 pastry and you have touched his gold. Therefore, I hereby declare that the case is now settled. (*He raps twice with his gavel. Manuel shamefacedly shoves the purse* 180 *across the table to Pablo and turns to leave. The judge stops him.*) Just a moment, Manuel! I hope this has been a lesson to you. In the future, think less 185 about making money and more about making friends. Good friends and neighbors are better than gold. And now, if you please—my fee!

190 **Manuel**: Yes, Your Honor. (*He opens his cash box willingly, but the judge closes the lid.*)
Judge: Put away your money. There's been enough fuss over 195 money already today. The fee I am asking is this—pies and cakes for everyone here—free of charge!

(Manuel nods his head vigorously 200 *in assent. The villagers and children cheer; then they rush to the pastry counter and help themselves. Manuel goes into the bakery and reappears with more* 205 *pastry piled high on a tray. Pablo and the judge hold a whole pie between them and start to eat from opposite edges toward the center of the pie. Fade out.)*

36 Which of the following shows that "The Baker's Neighbor" is a play?

A. It tells a true story.

B. It has talking animals.

C. It has stage directions.

D. It gives facts and information.

37 Why is Manuel angry with Pablo in the play?

A. Pablo takes ten gold pieces from Manuel.

B. Pablo steals some pastry from Manuel's bakery.

C. Pablo eats too many of Manuel's pies and cakes.

D. Pablo refuses to pay for something Manuel has worked hard to make.

38 In the play, why does the judge have Manuel count the gold pieces?

    A. to make sure Pablo gets punished

    B. so that Manuel is sure they are all there

    C. so that Manuel can enjoy touching the money

    D. to make sure that Pablo has counted correctly

39 How does Manuel pay the judge's fee at the end of the play?

    A. by giving him ten gold pieces

    B. by giving him free pastry for a year

    C. by letting him smell his pies and cakes

    D. by giving free pies and cakes to everyone

Read the sentence in the box below.

> First he must have a fair trial.

40 In the sentence, what part of speech is the word *fair*?

    A. adjective

    B. adverb

    C. noun

    D. verb

Grade 4 English Language Arts
Language and Literature
Spring 2005 Released Items:
Reporting Categories, Standards, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC)*
1	43	*Reading and Literature / Understanding a Text*	8	D
2	43	*Reading and Literature / Understanding a Text*	8	C
3	44	*Reading and Literature / Understanding a Text*	8	C
4	44	*Reading and Literature / Understanding a Text*	8	D
5	44	*Reading and Literature / Understanding a Text*	8	A
6	44	*Reading and Literature / Understanding a Text*	8	D
7	45	*Reading and Literature / Understanding a Text*	8	B
8	45	*Language / Vocabulary and Concept Development*	4	B
9	45	*Reading and Literature / Understanding a Text*	8	
10	47	*Reading and Literature / Poetry*	14	D
11	47	*Reading and Literature / Understanding a Text*	8	B
12	47	*Reading and Literature / Understanding a Text*	8	B
13	47	*Reading and Literature / Poetry*	14	B
14	50	*Reading and Literature / Understanding a Text*	8	D
15	50	*Reading and Literature / Style and Language*	15	A
16	50	*Reading and Literature / Myth, Traditional Narrative, and Classical Literature*	16	C
17	50	*Reading and Literature / Understanding a Text*	8	B
18	51	*Reading and Literature / Theme*	11	
19	55	*Reading and Literature / Style and Language*	15	A
20	55	*Reading and Literature / Fiction*	12	C
21	55	*Reading and Literature / Fiction*	12	A
22	55	*Reading and Literature / Fiction*	12	C
23	56	*Reading and Literature / Fiction*	12	B
24	56	*Reading and Literature / Fiction*	12	D
25	56	*Language / Structure and Origins of Modern English*	5	C
26	56	*Language / Vocabulary and Concept Development*	4	D
27	57	*Reading and Literature / Understanding a Text*	8	
28	59	*Reading and Literature / Nonfiction*	13	C
29	59	*Reading and Literature / Nonfiction*	13	A
30	60	*Reading and Literature / Understanding a Text*	8	C
31	60	*Reading and Literature / Nonfiction*	13	A
32	60	*Reading and Literature / Understanding a Text*	8	A
33	60	*Reading and Literature / Genre*	10	A
34	60	*Language / Vocabulary and Concept Development*	4	D
35	61	*Reading and Literature / Nonfiction*	13	
36	66	*Reading and Literature / Genre*	10	C
37	66	*Reading and Literature / Understanding a Text*	8	D
38	67	*Reading and Literature / Dramatic Literature*	17	C
39	67	*Reading and Literature / Dramatic Literature*	17	D
40	67	*Language / Structure and Origins of Modern English*	5	A

* Answers are provided here for multiple-choice items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.

IV. English Language Arts, Grade 7

A. Composition
B. Language and Literature

Grade 7 English Language Arts Test

Test Structure

The Grade 7 MCAS English Language Arts Test was presented in the following two parts:

- ▮ the ELA Composition Test, which used a writing prompt to assess learning standards from the Massachusetts *English Language Arts Curriculum Framework's* **Composition** strand

- ▮ the ELA Language and Literature Test, which used multiple-choice and open-response questions (items) to assess learning standards from the *Curriculum Framework's* **Language** and **Reading and Literature** strands

A. Composition

The spring 2005 Grade 7 MCAS English Language Arts Composition Test and Make-Up Test were based on learning standards in the **Composition** strand of the Massachusetts *English Language Arts Curriculum Framework* (2001). The learning standards for the Composition strand appear on pages 72–83 of the *Framework*, which is available on the Department Web site at www.doe.mass.edu/frameworks/ela/0601.pdf.

In *Test Item Analysis Reports* and on the *Subject Area Subscore* pages of the MCAS *School Reports* and *District Reports*, ELA Composition test results are reported under the **Composition** reporting category.

Test Sessions and Content Overview

The MCAS ELA Composition Test included two separate test sessions, administered on the same day with a short break between sessions. During the first session, each student wrote an initial draft of a composition in response to the appropriate writing prompt on the next page. During the second session, each student revised his/her draft and submitted a final composition, which was scored in the areas of Topic Development and Standard English Conventions. The MCAS Writing Score Guide (Composition Grade 7) is available at www.doe.mass.edu/MCAS/student/2004/scoring7.doc.

Reference Materials and Tools

At least one English-language dictionary per classroom was provided for student use during ELA Composition test sessions. The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only. No other reference materials or tools were allowed during either ELA Composition test session.

Cross-Reference Information

Framework general standards 19–22 are assessed by the ELA Composition.

Grade 7 Writing Prompt

WRITING PROMPT

Seventh grade is an important year. Learning new things and having new experiences may have changed you.

Your English teacher would like you to write about how you have changed since the beginning of the year. In a well-developed composition, describe **two** ways in which you have changed and explain what effect they have had on your life.

Grade 7 Make-Up Writing Prompt

WRITING PROMPT

Many people like to have a place where they can go to relax or unwind. It could be indoors or outdoors. Some people prefer quiet surroundings, while others like a busier atmosphere.

Think about a place you like to go to relax or unwind. In a well-developed composition, describe the place and explain why it is relaxing.

B. Language and Literature

The spring 2005 Grade 7 MCAS English Language Arts Language and Literature Test was based on learning standards in the two content strands of the Massachusetts *English Language Arts Curriculum Framework* (2001) listed below. Page numbers for the learning standards appear in parentheses.

❚ Language (*Framework*, pages 19–26)

❚ Reading and Literature (*Framework*, pages 35–64)

The *English Language Arts Curriculum Framework* is available on the Department Web site at www.doe.mass.edu/frameworks/ela/0601.pdf.

In *Test Item Analysis Reports* and on the *Subject Area Subscore* pages of the MCAS *School Reports* and *District Reports,* ELA Language and Literature test results are reported under two MCAS reporting categories: **Language** and **Reading and Literature**, which are identical to the two *Framework* content strands listed above.

Test Sessions and Content Overview

The MCAS Grade 7 ELA Language and Literature Test included three separate test sessions. Each session included selected readings, followed by multiple-choice and open-response questions. Common reading passages and test items are shown on the following pages as they appeared in test booklets. Due to copyright restrictions, certain reading passages cannot be released to the public on the Web site. All of these passages appear in the printed version of this document.

Reference Materials and Tools

The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only, during all three ELA Language and Literature test sessions. No other reference materials were allowed during any ELA Language and Literature test session.

Cross-Reference Information

The table at the conclusion of this chapter indicates each item's reporting category and the *Framework* general standard it assesses. The correct answers for multiple-choice questions are also displayed in the table.

English Language Arts
LANGUAGE AND LITERATURE: SESSION 1

DIRECTIONS
This session contains three reading selections with sixteen multiple-choice questions and two open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

Which animals are the smartest? Are horses smarter than dogs, and are dogs smarter than cats? Are monkeys smarter than all three? Scientists have long wondered how to measure an animal's intelligence. Read the article to see why determining animal intelligence is so difficult. Use information from the article to answer the questions that follow.

Are Dogs Dumb?

by Karen Hopkin

1   Chimps can use sign language to talk to their trainers. Monkeys can learn to count. A crow can figure out how to use a stick to get at that hard-to-reach grub. Chickens can learn to play checkers. Even worms can be taught to run mazes. So which animal is the smartest? You're probably thinking that chimps are smarter than chickens. And that crows are smarter than worms. And that you're smarter than all of them.

2   But where do those rankings come from? Okay, you probably are smarter than the average worm. But why do we assume that bigger beasts are smarter than smaller ones? Or that furry critters are brainier than slithering wrigglers that are coated in slime?

3   And how come we think dogs are so smart? Sure, a dog might be clever enough to fetch his leash when he wants to go out. But the same mutt might also bark at the vacuum cleaner and spend a whole hour chasing his own tail. Is Rover really any brighter than a hamster, a chicken, or that kid who's always eating Play-Doh? How can you measure an animal's brain power?

4   The hardest part is coming up with the right test. A dog can't sit down with a No. 2 pencil and take a multiple choice exam. So the test has to be something the dog can learn to do: select a block by nudging it with a nose or a paw, for example. The test also has to be something the dog wants to do: a dog might stare at that block all day without budging—until she figures out that there's a treat hidden underneath.

5   Norton Milgram and his co-workers at the University of Toronto at Scarborough use treats to give dogs a Canine IQ test. The dog is presented with a tray with a blue block on it; underneath the block is a treat. The animal moves the block and gets the treat. So far, so good. Now the test gets tricky. The dog is presented with the same tray, but this time it has both a blue block and a yellow coffee can lid (or white bowl or black square of cloth) on it; the

treat is now under the yellow lid (or white bowl, etc.). The test: how long does it take for the dog to learn that the treat is always under the new item on the tray? The smarter the dog, the quicker she'll find the treat.

6   That seems simple enough, but things become more complicated when you try to compare different kinds of animals. Monkeys wipe the floor with dogs on this test. Dogs may have to try hundreds of times before they select the yellow lid nine out of ten times. Monkeys learn much more quickly to find the hidden treat. Does that mean monkeys are smarter than dogs?

7   Not necessarily. The test was originally designed for monkeys, and it gives them an unfair advantage: by nature monkeys are curious and like to check out new things. Dogs, on the other hand, tend to be wary about approaching new things. As Stephen Budiansky reports in his book *The Truth about Dogs*, one pooch was so scared of the yellow lid that he had to be excused from the study.

8   If the test is made more dog-friendly, on the other hand, canines do just fine. Instead of introducing a yellow lid, the treat is put under another blue block on the opposite side of the tray. Dogs learn as quickly as any monkey that the treat is always on the side opposite the first block they saw.

9   Even if you could find a test that was perfectly fair to all animals, in a way it's silly to ask whether one kind of animal is smarter than another. All animals have the ability to learn things that are important to them. Otherwise they wouldn't survive. A chicken doesn't need to be a chess champion to figure out where to get food or how to run from a predator. So a chicken is as smart as it needs to be to earn a living as a chicken.

10   If you still believe that dogs are much smarter than chickens, it's probably because dogs are good at learning the things we want them to learn: fetching the newspaper, for example. Try to convince a chicken to do that! The truth is, most dog tricks take advantage of dogs' built-in behavior patterns—things that dogs are born knowing how to do or learn easily. Chasing and retrieving are leftover hunting behaviors. For a dog, fetching the paper or a tennis ball is not a reflection of intelligence. It's basically a demonstration that dogs will be dogs.

11   Canines may not be the deepest thinkers in the world. But perhaps that's for the best. The life of a dog—sitting alone all day, waiting for everyone to come home—can be pretty boring. Super-smart animals would probably get totally stressed out, says Serpell. Look at it this way: if dogs were any smarter, they probably wouldn't choose to hang around with us.

1   What is the **main** idea of this article?

A. Scientists have proven that monkeys are smarter than dogs because monkeys can count.

B. A University of Toronto research group discovered how to accurately measure animal intelligence.

C. Dogs are smarter than other animals because dogs think more like humans.

D. Animals have different levels of intelligence that can be measured only with the right tests.

2   According to paragraph 4, what is a requirement for a test of animal intelligence?

A. The test must be given while the animal is in obedience training.

B. The test must include a block-like object.

C. The test must compare two different animals.

D. The test must be something that can be taught to an animal.

3   According to paragraph 7, how are monkeys and dogs different?

A. Monkeys learn quickly, but dogs learn slowly.

B. Monkeys are willing to take tests, but dogs dislike taking them.

C. Monkeys investigate new things, but dogs shy away from them.

D. Monkeys do not like working with humans, but dogs do.

4   Which of the following **most** nearly means the same as the phrase "to earn a living as a chicken" in paragraph 9?

A. to purchase

B. to survive

C. to perform

D. to learn

5 According to the article, what makes humans think that dogs are smart?

A. Dogs do things that humans want them to do.

B. Dogs perform well on tests designed for humans.

C. Dogs are able to communicate with humans.

D. Dogs wait patiently for humans to come home.

6 According to the article, which of the following statements is true?

A. Bigger animals are smarter than smaller animals.

B. Animals cannot learn to do anything they are not born knowing how to do.

C. The smartest animals make the best pets.

D. Most animals are as smart as they need to be.

7 What does the phrase "Monkeys wipe the floor with dogs . . ." in paragraph 6 mean?

A. Monkeys have learned to clean floors.

B. Monkeys are neater than dogs.

C. Monkeys perform better than dogs.

D. Monkeys like to compete with dogs.

Write your answer to open-response question 8 in the space provided in your Student Answer Booklet.

8   Describe some problems that scientists face when designing intelligence tests for animals. Use relevant and specific information from the article to support your answer.

For centuries, different civilizations have created stories about the origin of the Earth. Read the following myth from the tradition of Australian Aborigines to find out how they believe the Earth was created. Use information from the myth to answer the questions that follow.

Baiame,
the Great Spirit

Students read a selection titled "Baiame, the Great Spirit" and then answered questions 9 through 13 that follow on the next page of this document.

Due to copyright restrictions, the selection cannot be released to the public over the Internet. However, the selection is printed in the publication *Release of Spring 2005 Test Items*, which has been sent to schools and libraries across the state. For more information, see the copyright citation below.

"Baiame, the Great Spirit" from OUT OF THE ARK: STORIES FROM THE WORLD'S RELIGIONS, copyright © 1996 by Anita Ganeri, reprinted by permission of Harcourt, Inc.

9 Which of these quotes from the myth helps the reader identify the story as a myth?

A. "This was when the spirits lived on Earth with the people and animals, and the landscape took its shape."

B. "The dry, brown earth bloomed with grass, flowers, and trees."

C. "The bees couldn't find any flower pollen, so they couldn't make any honey."

D. "It was steep and jagged, and many a time they nearly gave up."

10 According to the myth, why were animals and humans very small long ago?

A. They were frequently sick.

B. They had no room to grow.

C. They had to be smaller than Baiame.

D. They were cursed by a magic spell.

11 According to the myth, the people see Baiame as

A. a conquering hero.

B. a fellow human.

C. a powerful being.

D. a selfish ruler.

12 In the myth, what surprises the men on their return from seeing Baiame?

A. The village is deserted by the people.

B. The people have changed their minds about the flowers.

C. The flowers they picked have not wilted.

D. The journey takes longer than they expected.

13 What is the meaning of the word *consternation* as it is used in paragraph 5?

A. confusion

B. happiness

C. boredom

D. peacefulness

Sometimes pets and their owners have different views about the same things. Read the exchange between an owner and her cat in the poem "On A Night of Snow." *Answer the questions that follow.*

On a Night of Snow

Cat, if you go outdoors you must walk in the snow.
You will come back with little white shoes on your feet,
little white slippers of snow that have heels of sleet.
Stay by the fire, my cat. Lie still, do not go.
5 See how the flames are leaping and hissing low;
I will bring you a saucer of milk like a marguerite,[1]
so white and so smooth, so spherical and so sweet—
stay with me, Cat. Outdoors the wild winds blow.

Outdoors the wild winds blow, Mistress, and dark is the
10   night,
strange voices cry in the trees, intoning[2] strange lore;
and more than cats move, lit by our eyes' green light,
on silent feet where the meadow grasses hang hoar[3]—
Mistress, there are portents[4] abroad of magic and might
15 and things that are yet to be done. Open the door!

ELIZABETH COATSWORTH

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[1] *marguerite* — daisy
[2] *intoning* — singing
[3] *hoar* — covered with frost
[4] *portents* — signs of things to come

14   What mood is conveyed by the phrase, "wild winds blow" in stanza 1?

    A. hope

    B. danger

    C. comfort

    D. adventure

15   Which of the following **best** describes the character of Mistress in the poem?

    A. protective

    B. carefree

    C. forceful

    D. understanding

16   What is the effect of line 5 in the poem?

    A. The fire seems to be alive.

    B. The fire has gone out.

    C. The fire looks out of control.

    D. The fire is unimportant.

17   Which of the following **best** explains why an exclamation mark is used at the end of the last sentence of the poem?

    A. to emphasize that Mistress insists that Cat stay inside

    B. to emphasize that Mistress does not care about Cat's needs

    C. to emphasize that Cat does not want to be around Mistress

    D. to emphasize that Cat really wants Mistress to let him outside

Write your answer to open-response question 18 in the space provided in your Student Answer Booklet.

18 Explain the **two** contrasting points of view presented by Mistress and Cat in the poem. Use relevant and specific information from the poem to support your answer.

English Language Arts
Language and Literature: Session 2

DIRECTIONS
This session contains one reading selection with seven multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

A teenage girl from the island of Antigua is being sent to live with relatives in England where she will attend nursing school. As she walks with her parents along the jetty where a boat awaits her, she remembers the walks to the jetty she used to take with her father in years past. This young girl has mixed feelings about leaving. Read this excerpt from the novel Annie John *to see what happens. Answer the questions that follow.*

A WALK TO THE JETTY

by Jamaica Kincaid

1   My heart now beat fast, and no matter how hard I tried, I couldn't keep my mouth from falling open and my nostrils from spreading to the ends of my face. My old fear of slipping between the boards of the jetty and falling into the dark-green water where the dark-green eels lived came over me. When my father's stomach started to go bad, the doctor had recommended a walk every evening right after he ate his dinner. Sometimes he would take me with him. When he took me with him, we usually went to the jetty, and there he would sit and talk to the night watchman about cricket[1] or some other thing that didn't interest me, because it was not personal; they didn't talk about their wives, or their children, or their parents, or about any of their likes and dislikes. They talked about things in such a strange way, and I didn't see what they found funny, but sometimes they made each other laugh so much that their guffaws[2] would bound out to sea and send back an echo. I was always sorry when we got to the jetty and saw that the night watchman on duty was the one he enjoyed speaking to; it was like being locked up in a book filled with numbers and diagrams and what-ifs. For the thing about not being able to understand and enjoy what they were saying was I had nothing to take my mind off my fear of slipping in between the boards of the jetty.

2   Now, too, I had nothing to take my mind off what was happening to me. My mother and my father—I was leaving them forever. My home on an island—I was leaving it forever.

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[1]*cricket* — an outdoor game played with bats, a ball, and wickets by two teams of eleven each
[2]*guffaw* — a hearty burst of laughter

83

What to make of everything? I felt a familiar hollow space inside. I felt I was being held down against my will. I felt I was burning up from head to toe. I felt that someone was tearing me up into little pieces and soon I would be able to see all the little pieces as they floated out into nothing in the deep blue sea. I didn't know whether to laugh or cry. I could see that it would be better not to think too clearly about any one thing. The launch was being made ready to take me, along with some other passengers, out to the ship that was anchored in the sea. My father paid our fares, and we joined a line of people waiting to board. My mother checked my bag to make sure that I had my passport, the money she had given me, and a sheet of paper placed between some pages in my Bible on which were written the names of the relatives—people I had not known existed— with whom I would live in England. Across from the jetty was a wharf, and some stevedores[3] were loading and unloading barges. I don't know why seeing that struck me so, but suddenly a wave of strong feeling came over me, and my heart swelled with a great gladness as the words "I shall never see this again" spilled out inside me. But then, just as quickly, my heart shriveled up and the words "I shall never see this again" stabbed at me. I don't know what stopped me from falling in a heap at my parents' feet.

3   When we were all on board, the launch headed out to sea. Away from the jetty, the water became the customary blue, and the launch left a wide path in it that looked like a road. I passed by sounds and smells that were so familiar that I had long ago stopped paying any attention to them. But now here they were, and the ever-present "I shall never see this again" bobbed up and down inside me. There was the sound of the seagull diving down into the water and coming up with something silverish in its mouth. There was the smell of the sea and the sight of small pieces of rubbish floating around in it. There were boats filled with fishermen coming in early. There was the sound of their voices as they shouted greetings to each other. There was the hot sun, there was the blue sea, there was the blue sky. Not very far away, there was the white sand of the shore, with the run-down houses all crowded in next to each other, for in some places only poor people lived near the shore. I was seated in the launch between my parents, and when I realized that I was gripping their hands tightly I glanced quickly to see if they were looking at me with scorn, for I felt sure that they must have

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[3]*stevedore* — one who loads or unloads ships or barges

known of my never-see-this-again feelings. But instead my father kissed me on the forehead and my mother kissed me on the mouth, and they both gave over their hands to me, so that I could grip them as much as I wanted. I was on the verge of feeling that it had all been a mistake, but I remembered that I wasn't a child anymore, and that now when I made up my mind about something I had to see it through. At that moment, we came to the ship, and that was that.

19 Which sentence **best** expresses the main idea of this excerpt?

A. Long journeys require advanced planning.

B. Success is the result of hard work.

C. Growing up involves overcoming one's fears.

D. One person's loss is another's gain.

20 In paragraph 1, what had originally brought the speaker to the jetty?

A. The speaker was a young girl who liked cricket.

B. The speaker's family was going on a voyage.

C. The speaker's father had an illness.

D. The speaker was a fisherman's daughter.

Read the sentence from paragraph 2 in the box below.

> I felt a familiar hollow space inside.

21 Which word **best** describes the speaker's emotion?

A. joy

B. guilt

C. appreciation

D. fear

Read the sentence from paragraph 3 in the box below.

> There was the hot sun, there was the blue sea, there was the blue sky.

22 What is the effect of the repetition of the phrase "There was"?

A. It conveys the speaker's eagerness to go to England.

B. It captures how boring the speaker's life has become.

C. It shows that these things are unusual to the speaker.

D. It emphasizes the power of the speaker's connection to her home.

23 Why does the speaker finally decide that leaving Antigua to live in England is **not** a mistake?

A. She dislikes living near the jetty and the overcrowded housing.

B. She feels she has to grow up and must stick to her decisions.

C. She dislikes the smell of the sea and the sight of floating rubbish.

D. She is angry with her parents for making her leave home.

Read the phrase from the beginning of paragraph 3 in the box below.

> Away from the jetty, the water became the customary blue . . .

24 What does the word *customary* tell the reader about the water?

A. The water looks as it does before a storm.

B. The water looks as it usually does away from the shoreline.

C. The water looks as it does during high tide.

D. The water looks as it does during sunset.

Read the excerpt from paragraph 3 in the box below.

> . . . I felt sure that they must have known of my never-see-this-again feelings.

25 The phrase "never-see-this-again" is used as which part of speech in this excerpt?

A. a noun

B. a verb

C. an adjective

D. an adverb

Write your answer to open-response question 26 in the space provided in your Student Answer Booklet.

26   Identify and explain the mixed feelings the speaker has about leaving her home.
       Use relevant and specific information from the excerpt to support your answer.

English Language Arts
LANGUAGE AND LITERATURE: SESSION 3

DIRECTIONS
This session contains two reading selections with thirteen multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

What happens when exotic species of life are transported to a place where they have no natural predators? These biological invaders can cause problems around the world. Read the excerpt from the article, "Stopping the Alien Invaders," to find out how the government in Hawaii takes steps to prevent alien invaders from destroying native plants and animals. Use information from the excerpt to answer the questions that follow.

Stopping the Alien Invaders
by Sneed B. Collard III

1   What are these organisms? They can be plants, animals, fungi, viruses, bacteria, or any other life form you can think of. The one thing they all have in common is that they are living in places where they don't belong.

2   A 1993 study by the U.S. Congress Office of Technology Assessment reported that at least 4,500 exotic species have established themselves in the United States. Over 600 of these cause serious problems. Exotic diseases such as AIDS and Lyme disease endanger human health. Exotic insects such as fire ants damage farm equipment, sting people, and kill native animals. Exotic weeds of many kinds take over farmland. Some, such as the paperbark tree from Australia, threaten to take over Everglades National Park and other natural areas.

3   Since the turn of the century, 79 biological invaders alone have cost the U.S. economy 97 billion dollars. Every state has been affected, but some have been hit especially hard. These include California, Florida, and—more than anywhere else—Hawaii.

4   Hawaii is an important trading center and home to over a dozen military bases. About six million tourists visit the Hawaiian islands every year. With all that traffic in and out, exotic species have plenty of opportunities to reach the islands. Some invaders, such as pets and garden plants, are brought in on purpose. Others, like the brown tree snake, sneak in with food, military equipment, furniture, and even the U.S. mail.

5   According to biologists who work in Hawaii, exotic species are the number one threat to the state's economy, environment, and way of life. Exotic agricultural pests damage crops and prevent farmers from selling millions of dollars' worth of fruits and vegetables to the mainland. Exotic goats, pigs, and other mammals rip up Hawaii's rain forests. Exotic parasites* such as mosquitoes spread deadly diseases to native birds.

6   The question in Hawaii and other places is, can the invaders be stopped?

7   Despite our best efforts, many exotic species will continue to reach new places around the world. Some will be imported intentionally. Others will be brought in by accident. However, there is a lot we can do to slow the rate of biological invasions.

8   *Quarantines* are one way to do this. Quarantine is the process of isolating animals or products. In Hawaii, pet dogs and cats coming into the state remain in a special holding facility for four months to make sure they don't have rabies. Many agricultural products are also quarantined to see if they are carrying insect pests or plant diseases.

9   *Inspection* is a second way to stop biological invaders. At airports, borders, and shipping ports, inspectors examine passengers and their baggage to see if they are carrying exotic species. The inspectors confiscate and destroy fruits, vegetables, or other goods that might be carrying harmful pests or diseases. Specially trained dogs also sniff cargo for exotic species, such as the brown tree snake.

10   What if an exotic species slips by inspectors? Then efforts are made to control the invader. In Hawaii, government agencies control invaders by setting livetraps around wildlife refuges and other places. The traps catch exotic cats, rats, and mongooses that eat native birds and their eggs. At Haleakala National Park employees have built miles of fences to keep out exotic pigs and goats. For years these animals ate and trampled native rain forest plants, but the fences have helped reverse this damage. Now native plants grow in places that were bare rock only a short time ago.

11   In some cases *biological control* helps to solve the exotic species problem. Biological control or "biocontrol" is the science of controlling one invader with another. In the early 1900s, several exotic predators were imported to Hawaii to eat a harmful exotic pest called the sugarcane leafhopper. The insect was destroying 70,000 tons of sugar a year, but the predators brought it under control. More recently, a parasite from Bolivia has been used to kill another sugarcane pest, the lesser cornstalk borer.

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parasite — an organism that feeds on a living host but does not contribute to the host

12   Biological control efforts have sometimes backfired. The mongoose was originally brought to Hawaii to eat rats. Instead, it wound up dining on endangered honeycreepers and other native birds. Because of the mongoose and other biocontrol disasters, scientists all over the world now carefully test biocontrol agents before releasing them into the wild.

13   The efforts of these scientists and other people are vitally important. In Hawaii alone, 10,000 different species of native plants and animals still need to be protected. Many of these are found nowhere else on earth. By stopping the spread of the brown tree snake and other biological invaders, we not only protect ourselves, but we also protect the many other native species that make our planet such a special place to live.

27 What is this excerpt **mainly** about?

A. the hazards of the brown tree snake

B. the dangers of non-native species

C. problems faced by the Hawaiian economy

D. the importance of biologists

28 How do paragraphs 2 and 3 contribute to the development of the excerpt?

A. They pose questions to be answered later in the article.

B. They provide background for the main idea of the article.

C. They preview the major points of the article.

D. They give definitions of terms that will be used in the article.

29 Based on the excerpt, which of the following **best** explains why Hawaii is at a great risk of invasion by exotic species?

A. Over 4500 exotic species exist in the United States.

B. Hawaii is made up of several islands.

C. Millions of people go to Hawaii each year.

D. Biological control efforts have not worked.

30 How are paragraphs 6 and 7 organized to help the reader understand the information presented in the excerpt?

A. They ask a question and provide an answer.

B. They show a cause and a resulting effect.

C. They list comparisons and contrasts.

D. They give descriptions and furnish explanations.

31 Which of the following provides the **best** evidence that future attempts to use biological controls will need to be more carefully planned?

A. The brown tree snake sneaked into Hawaii aboard air cargo.

B. Pets coming to Hawaii from the mainland are quarantined for four months.

C. Hawaii had to introduce a Bolivian parasite to save sugar crops.

D. The mongoose ate more native Hawaiian birds than it did rats.

32 What argument does the author make in the final paragraph?

A. Hawaii has the most unknown species of plants on earth.

B. Humans have a responsibility to control "alien" species.

C. The brown tree snake is the most dangerous of all species.

D. Species should be allowed to exist without human interference.

33 Based on the excerpt, if scientists in Hawaii cannot control biological invaders, what will be the **most likely** result?

A. Hawaii's farmers will lose millions of dollars in livestock trade.

B. Quarantine times for incoming pets may be extended.

C. Many of Hawaii's native species may no longer exist.

D. Exotic species will no longer spread to other countries.

34 At the end of paragraph 3, what is the purpose of setting apart the phrase "—more than anywhere else—" with dashes?

A. to compare Florida and California

B. to indicate that Hawaii is typical

C. to emphasize that Hawaii is most affected

D. to illustrate the problems of three states

Write your answer to open-response question 35 in the space provided in your Student Answer Booklet.

35 Based on information from the excerpt, choose **two** methods of dealing with the threat of "alien" species. Explain why these methods are effective. Use relevant and specific information from the excerpt to support your answer.

This excerpt is from a play based on Mark Twain's classic novel, The Adventures of Tom Sawyer. *Tom lives with his Aunt Polly and his cousin Sid. One morning, Tom attempts his mischief on his aunt and cousin. Read the excerpt below. Use information from the excerpt to answer the questions that follow.*
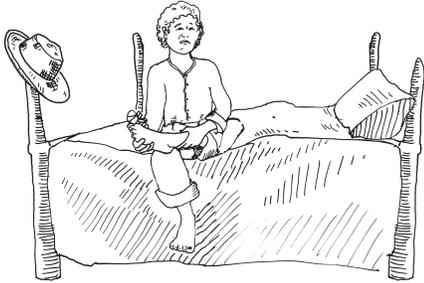
Tom Sawyer

by Sara Spencer

ACT ONE

SCENE 1. *Tom's bedroom. A double bed, a wash stand, a motto on the wall.*

(*Tom and Sid are asleep, Tom snoring vociferously,* Sid snoring like a steam whistle.*)

AUNT POLLY: (*Offstage.*) Tom! Oh, Tom! Monday!

TOM: (*Opens his eyes dazedly, yawns, then comes alert.*) Monday! (*He sighs drearily, then begins to plan. Feels around over his body for ailments, coughing experimentally, rejecting a*
5   *loose tooth, etc. Finally he unties the rag around his sore toe, and falls to groaning.*). Oh-h-h! (*But Sid snores on.*) Ohh-h-h-h! Oooh-h-h! (*No response from Sid. Tom reaches over and shakes him.*) Sid! Sid! Ohhhhh-h-h-h! Ooooh-h-h-h!

SID: (*Waking up.*) Tom! Say, Tom!

10 **TOM**: Ohhhhhh-h-h-h-h! Ooooooh-h-h-h!

SID: (*Shaking him.*) Here, Tom. Tom! What's the matter, Tom?

TOM: Oh, don't, Sid. Don't joggle me.

SID: Why, what's the matter, Tom? I must call Auntie.

TOM: No, never mind. It'll be over by and by, maybe. Don't
15 call any-body. Ohhhhhhhhh-h-h-h-h-h!

SID: But I must. Don't groan so, Tom. It's awful! How long you been this way?

TOM: Hours. Ouch! Don't stir so, Sid. You'll kill me. Ohhhhhh-h-h-h!

20 **SID**: Tom, why didn't you wake me sooner? Oh, Tom, don't! It makes my flesh crawl to hear you.

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vociferously — loudly

TOM: I forgive you everything, Sid. Ohhh-h-h-h-h! Everything you ever done to me.

SID: Oh, Tom, you ain't dying, are you? Don't, Tom. Oh,
25 don't! Maybe—

TOM: I forgive everybody, Sid. Tell 'em so, Sid. And Sid, you give my brass knob and my cat with one eye to Joe Harper. And tell him—Ohhh-h-h-h!

SID: (*Making for the door.*) Oh, Aunt Polly! Come quick!
30 Tom's dying!

AUNT POLLY: (*Offstage.*) Dying?

SID: Yes'm. Don't wait. Come quick!

AUNT POLLY: (*Still offstage.*) Rubbage! I don't believe it. (*But she rushes in, just the same, and finds Tom on the bed, writhing.*)
35 You, Tom! Tom, what's the matter with you?

TOM: Oh, Auntie, I'm—Oh-h-h-h!

AUNT POLLY: What's the matter? What is the matter with you, child?

TOM: Oh, Auntie—my sore toe's mortified!

40 AUNT POLLY: (*Sinking on the bed with relief, and chuckling.*) Tom, what a turn you did give me! Now you shut up that nonsense and climb out of this.

TOM: (*Quite subdued.*) Aunt Polly, it seemed mortified. And—and it hurt so, I never minded my tooth at all.

45 AUNT POLLY: Your tooth, indeed. What's the matter with your tooth?

TOM: One of 'em's loose, and it aches perfectly awful. Oh-h-h-h-h!

AUNT POLLY: There, now, don't begin that groaning again.
50 Open your mouth. Well, your tooth is loose, but you're not going to die about that. Sid, get me a hot iron off the kitchen stove. (*Sid gleefully rushes off, as Aunt Polly pulls a spool of thread from her apron pocket, and attaches one end of it to the bedpost. The other end she attached to Tom's tooth.*)

55 TOM: (*Shrinking away.*) Oh, please, Auntie, don't pull it out. It don't hurt anymore. I wish I may never stir if it does. Please don't, Auntie. I don't want to stay home from school.

AUNT POLLY: Oh, you don't, don't you? So all this was

60 because you thought you'd get to stay home from school and go a-fishing. Oh, Tom, you'll be the death of me yet. Here, Sid. (*Sid has reentered with the iron, and gives it to her, gloating at Tom's misery. Aunt Polly thrusts the iron close to Tom's face. Tom jerks back, and the tooth is dangling by the bedpost.*)

65 SID: Goody, that's what you get.

AUNT POLLY: Now you boys get your clothes on, and come on here to breakfast. I have an errand for you, Tom, before you go to school. (*Aunt Polly goes out.*)

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36 What does Tom begin to "plan" in line 3 of the excerpt?

A. to get Sid into trouble

B. to get permission to go fishing

C. to get rid of his loose tooth

D. to get out of going to school

37 Why is Tom making so much noise at the opening of the excerpt?

A. He has a toothache.

B. He is unable to sleep.

C. He is dressing in the dark.

D. He wants to wake up Sid.

38 According to the play, why is Sid happy when Aunt Polly is about to remove Tom's tooth?

A. Sid thinks he will also get a day off.

B. Sid thinks Tom has fooled Aunt Polly.

C. Sid thinks Tom is getting what he deserves.

D. Sid thinks Tom will get well.

39 What is the **best** characterization of Tom in this excerpt?

A. He is a comical prankster.

B. He is a hardworking student.

C. He is an obedient nephew.

D. He is an absent-minded dreamer.

40 The word *gloating* as used in line 62 shows that Sid is expressing

A. anger.

B. surprise.

C. pleasure.

D. frustration.

Grade 7 English Language Arts
Language and Literature
Spring 2005 Released Items:
Reporting Categories, Standards, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC)*
1	75	Reading and Literature / Understanding a Text	8	D
2	75	Reading and Literature / Understanding a Text	8	D
3	75	Reading and Literature / Nonfiction	13	C
4	75	Reading and Literature / Nonfiction	13	B
5	76	Reading and Literature / Understanding a Text	8	A
6	76	Reading and Literature / Nonfiction	13	D
7	76	Language / Vocabulary and Concept Development	4	C
8	77	Reading and Literature / Understanding a Text	8	
9	79	Reading and Literature / Myth, Traditional Narrative, and Classical Literature	16	A
10	79	Reading and Literature / Understanding a Text	8	B
11	79	Reading and Literature / Myth, Traditional Narrative, and Classical Literature	16	C
12	79	Reading and Literature / Understanding a Text	8	C
13	79	Language / Vocabulary and Concept Development	4	A
14	81	Reading and Literature / Style and Language	15	B
15	81	Reading and Literature / Poetry	14	A
16	81	Reading and Literature / Poetry	14	A
17	81	Language / Structure and Origins of Modern English	5	D
18	82	Reading and Literature / Poetry	14	
19	85	Reading and Literature / Understanding a Text	8	C
20	85	Reading and Literature / Understanding a Text	8	C
21	85	Reading and Literature / Style and Language	15	D
22	86	Reading and Literature / Style and Language	15	D
23	86	Reading and Literature / Understanding a Text	8	B
24	86	Language / Vocabulary and Concept Development	4	B
25	86	Language / Structure and Origins of Modern English	5	C
26	87	Reading and Literature / Fiction	12	
27	91	Reading and Literature / Understanding a Text	8	B
28	91	Reading and Literature / Nonfiction	13	B
29	91	Reading and Literature / Nonfiction	13	C
30	91	Reading and Literature / Nonfiction	13	A
31	92	Reading and Literature / Nonfiction	13	D
32	92	Reading and Literature / Nonfiction	13	B
33	92	Reading and Literature / Nonfiction	13	C
34	92	Language / Structure and Origins of Modern English	5	C
35	93	Reading and Literature / Nonfiction	13	
36	96	Reading and Literature / Dramatic Literature	17	D
37	96	Reading and Literature / Dramatic Literature	17	D
38	97	Reading and Literature / Dramatic Literature	17	C
39	97	Reading and Literature / Dramatic Literature	17	A
40	97	Language / Vocabulary and Concept Development	4	C

* Answers are provided here for multiple-choice items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.

V. English Language Arts, Grade 10

A. Composition
B. Language and Literature

Grade 10 English Language Arts Test

Test Structure

The Grade 10 MCAS English Language Arts Test was presented in the following two parts:

▌ the ELA Composition Test, which used a writing prompt to assess learning standards from the Massachusetts *English Language Arts Curriculum Framework's* **Composition** strand

▌ the ELA Language and Literature Test, which used multiple-choice and open-response questions (items) to assess learning standards from the *Curriculum Framework's* **Language** and **Reading and Literature** strands

A. Composition

The spring 2005 Grade 10 MCAS English Language Arts Composition Test and Make-Up Test were based on learning standards in the **Composition** strand of the Massachusetts *English Language Arts Curriculum Framework* (2001). The learning standards appear on pages 72–83 of the *Framework*, which is available on the Department Web site at www.doe.mass.edu/frameworks/ela/0601.pdf.

In *Test Item Analysis Reports* and on the *Subject Area Subscore* pages of the MCAS *School Reports* and *District Reports*, ELA Composition test results are reported under the **Composition** reporting category.

Test Sessions and Content Overview

The MCAS ELA Composition Test included two separate test sessions, administered on the same day with a short break between sessions. During the first session, each student wrote an initial draft of a composition in response to the appropriate writing prompt on the next page. During the second session, each student revised his/her draft and submitted a final composition, which was scored in the areas of Topic Development and Standard English Conventions. The MCAS Writing Score Guide (Composition Grade 10) is available at www.doe.mass.edu/MCAS/student/2004/scoring10.doc.

Reference Materials and Tools

At least one English-language dictionary per classroom was provided for student use during ELA Composition test sessions. The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only. No other reference materials or tools were allowed during either ELA Composition test session.

Cross-Reference Information

Framework general standards 19–22 are assessed by the ELA Composition.

Grade 10 Writing Prompt

WRITING PROMPT

Often, works of literature include characters that change as a result of a particular event.

From a work of literature you have read in or out of school, select a character that has been changed by a particular event. In a well-developed composition, identify the character, describe the event, and explain why the character's change is important to the work of literature.

Grade 10 Make-Up Writing Prompt

WRITING PROMPT

Honor can have different meanings for different people. Literature is full of characters that can be considered honorable.

From a work of literature you have read in or out of school, select a character that is honorable. In a well-developed composition, identify the character, describe what makes the character honorable, and explain why the character's honor is important to the work of literature.

B. Language and Literature

The spring 2005 Grade 10 MCAS English Language Arts Language and Literature Test was based on learning standards in the two content strands of the Massachusetts *English Language Arts Curriculum Framework* (2001) listed below. Page numbers for the learning standards appear in parentheses.

▮ Language (*Framework*, pages 19–26)

▮ Reading and Literature (*Framework*, pages 35–64)

The *English Language Arts Curriculum Framework* is available on the Department Web site at www.doe.mass.edu/frameworks/ela/0601.pdf.

In *Test Item Analysis Reports* and on the *Subject Area Subscore* pages of the MCAS *School Reports* and *District Reports*, ELA Language and Literature test results are reported under two MCAS reporting categories: **Language** and **Reading and Literature**, which are identical to the two *Framework* content strands listed above.

Test Sessions and Content Overview

The MCAS grade 10 ELA Language and Literature Test included three separate test sessions. Sessions 1 and 2 were both administered on the same day, and Session 3 was administered on the following day. Each session included selected readings, followed by multiple-choice and open-response questions. Common reading passages and test items are shown on the following pages as they appeared in test booklets. Due to copyright restrictions, certain reading passages cannot be released to the public on the Web site. All of these passages appear in the printed version of this document.

Reference Materials and Tools

The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only, during all three ELA Language and Literature sessions. No other reference materials were allowed during any ELA Language and Literature test session.

Cross-Reference Information

The table at the conclusion of this chapter indicates each item's reporting category and the *Framework* general standard it assesses. The correct answers for multiple-choice questions are also displayed in the table.

English Language Arts
LANGUAGE AND LITERATURE: SESSION 1

DIRECTIONS
This session contains three reading selections with sixteen multiple-choice questions and two open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

Many people will never come face-to-face with a skunk because skunks and people tend to avoid one another. However, for one scientist who studies skunks, their spray is not a factor. Jerry Dragoo is a skunk's best friend, doing whatever he can to help the species. Read more about this remarkable scientist in "Skunk Man," *and answer the questions that follow.*

Skunk Man

JERRY DRAGOO IS UNIQUELY
QUALIFIED FOR HIS STINKY JOB

BY STEVE KEMPER

1   THE FIRST TIME I MEET JERRY DRAGOO, he doesn't stink. That will change, but at the moment, sitting in his office at the University of New Mexico in Albuquerque, he seems like just another assistant professor of biology dressed in jeans and cowboy boots. Except that his Western belt buckle, instead of displaying the usual turquoise or embossed-silver design, depicts a spotted skunk standing on its forelegs.

2   The buckle signifies Dragoo's passion. He studies skunks; his research has changed science's view of them. He rescues, rehabilitates and relocates skunks. He responds to half a dozen e-mails every day from all over the country asking about skunks. (Question: "My pet skunk tears up the carpet. What should I do?" Answer: "Put down tile. Skunks are diggers.") When Dragoo goes home at night, he lives with skunks—four in his backyard, three in his house. All of them are fully loaded, and they occasionally discharge their weapons in the living room. "My wife has a problem with that," Dragoo admits.

3   Though skunks are one of the most recognizable animals in America, the field of skunk studies is not crowded. Notwithstanding such beloved cartoon and film characters as Pepe Le Pew and Flower (Bambi's friend), real skunks do not show up on any favorite-critter lists. Yet in the 1800s and early 1900s, skunk fur was prized by clothiers and was often marketed as "Alaskan sable."

4   Jerry Dragoo is genetically outfitted for intimacy with skunks. Now 40, he remembers the day he discovered his fated field of study. As an undergraduate, he was drawn to the mustelids, the carnivorous weasel family that includes badgers, otters, minks and wolverines. "Small ferocious animals," he says. "I liked that, being kind of small myself." The mustelids also included a mild-mannered oddball (a description that also fits Dragoo), the skunk.

5   When a professor asked Dragoo to research spotted skunks, he was a little disappointed. After capturing his first one in a wire live trap, he sat there making field notes. When he rose abruptly, he felt a drizzle. He looked up. No clouds. He looked down

and saw oily yellow spots on his notes. Olfactory data. He sniffed tentatively, but didn't smell anything. "And I thought, 'Why do skunks have such a bad name?' But three days later, when I came back to school, they kicked me out of the building." Dragoo, it turns out, has almost no sense of smell. He found his calling and has pursued it ever since.

6   Soon after arriving at Fort Hays State University in Kansas, where he got his master's degree in biology, he skinned a road-killed skunk. The department chairman quickly got wind of it and phoned in his reaction: "You will not skin skunks in this building." Dragoo got the same indignant order shortly after starting work on his doctorate at Texas A & M, where he studied, among other things, hog-nosed skunks. By then he was fearless. Instead of collecting his research animals with traps, he was running them down and grabbing their tails, with predictable consequences.

7   "People ask how many times I've been sprayed, and I tell them six or seven." He pauses. "Per animal." Not long ago a hooded skunk nailed him nine times in less than ten seconds, a feat that filled him with admiration. Do his colleagues find him hard to work with? "I've heard that," he deadpans.[1] He has been kicked out of meetings, shunned in public places and evicted from apartments. "If people smell a skunk and I'm around," he says, "I get blamed. Most of the time I'm guilty. But not every time," he adds, his tail up a little.

A NEW BRANCH ON THE TREE

. . .

8   Dragoo's major contribution to skunk studies stems from his work as an evolutionary biologist. He's interested in the genetic differences and similarities among related species, which helps explain how they are related. In the early 1990s, he began sequencing particular genes in skunks and other mustelids to see how the subfamilies overlapped.

9   "But I couldn't get the skunks to group with the mustelids," he says. Assuming that he had done something wrong, Dragoo started over but got the same results. That's when he realized that at some point millions of years ago, North American skunks (striped, hooded, spotted and hog-nosed) and the Asian stink badger had branched off from the tree of life to form their own distinct family.

10   A new family classification is rare, so Dragoo's 1997 paper, coauthored by Rodney Honeycutt of Texas A & M, created a stir. Says Don Wilson, senior scientist and curator of mammals at the Smithsonian's National Museum of Natural History: "The molecular evidence is pretty convincing."

11   Now Dragoo is applying for funding to study the ecology of rabies in skunks. Skunks are a major carrier of the disease, but Dragoo says animal-control officers and homeowners are more frightened of them than they need to be, since not all skunks are rabid and rabies is treatable. This spells big trouble for many innocent animals. Dragoo cites a baby skunk that some children found in their yard and spent time petting before he was called. The local animal-control officer then insisted that Dragoo turn it over to be killed and tested for rabies. The results were negative.

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[1] *deadpans* — says something without expression or emotion

BE PATIENT, THEY'LL LEAVE

12   Each year between May and September, when adult female skunks and their litters forage widely, Dragoo gets calls from homeowners who want to know how to get rid of them. He has heard of people trying mothballs, loud music, or rags soaked in ammonia to encourage skunks to leave. But he tries to convince callers to be patient, because skunks are fun to watch, they won't spray unless they feel threatened (and even then they usually try to escape first), they eat lots of mice and bugs, and they usually move on.

13   When nuisance skunks are trapped, injured or orphaned, Dragoo is often asked to get them. He drives the captured animals to his house in Tijeras—his station wagon carries an unmistakable tang—and puts them in one of the large holding cages in his backyard. He and his profoundly tolerant wife, Gwen, who is the head veterinary technician at the Albuquerque Biological Park, fatten young animals for a month or two on fruit, vegetables, eggs, tuna, a little dog and cat food, yogurt, cheese, an occasional frozen mouse, cereal, tomato hornworms, moths and June bugs that stray into the house, and anything else that comes to hand. Skunks, to state the obvious, are omnivores, though they do draw the line at lima beans.

14   When independence day rolls around, Dragoo lets the animals go in the nearby Cibola National Forest. But first they must be caught. "Hi, kids!" Dragoo says. "Who wants to be first?" He grabs one by the tail and puts it in a pet carrier. The cage's other resident runs from Dragoo, sometimes hissing or charging forward, then stamping its front feet. As Dragoo closes in, this striper whirls and squirts. Bull's-eye! But Dragoo, unfazed, grabs it by the tail and stuffs it into the carrier. "I'm happy when they spray me," he says, "because that means they have some fear of humans."

15   He captures the last two without incident. En route to the forest, the skunks are silent and, more important, odorless. Dragoo is neither. "You stink," Gwen says amiably. The smell coming off him, acrid[2] and almost palpable,[3] contains a hint of horseradish. Gwen says it reminds her of gasoline. Dragoo grins and says, "Rose petals."

. . .

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[2] *acrid* — having a sharp pungent taste or smell

[3] *palpable* — discernible by touch; tangible

1 What is this article **mainly** about?

    A. the consequences of getting too close to a skunk

    B. the unpleasant smell of a skunk's spray

    C. the rehabilitation and release of sick or injured skunks

    D. the dedication of a researcher to skunks

2 Which of the following **best** summarizes paragraph 1?

    A. Jerry Dragoo appears to be an ordinary person.

    B. Jerry Dragoo collects turquoise and silver belt buckles.

    C. Assistant professors usually wear western clothing in New Mexico.

    D. Biology professors often display unusual behavior.

Read the sentences from paragraph 7 in the box below.

> "If people smell a skunk and I'm around," he says, "I get blamed. Most of the time I'm guilty. But not every time," he adds, his tail up a little.

3 What is the author implying?

    A. Dragoo likes skunks because he shares similar behaviors with them.

    B. Skunks in the wild become irritated very easily.

    C. Dragoo feels a bit annoyed when he is unjustly blamed for unpleasant odors.

    D. People react like skunks when they are threatened.

4 According to the article, in what way is Jerry Dragoo uniquely suited for his job?

    A. He studied mustelids as an undergraduate.

    B. He enjoys having skunks as pets.

    C. He has a very limited sense of smell.

    D. He is an evolutionary biologist.

5 According to the article, what is Professor Dragoo's most important accomplishment?

A. He has persuaded people to be more tolerant of skunks.

B. He has reclassified skunks into their own genetic family.

C. He has rescued many skunks in urban environments.

D. He has begun to study the ecology of rabies in skunks.

6 In the article, why is Gwen Dragoo described as "profoundly tolerant"?

A. She is head veterinary technician at the Albuquerque Biological Park.

B. She helps feed many injured and orphaned animals.

C. She helps Dragoo release the skunks in the Cibola National Forest.

D. She endures the odor of the skunks in her house and on her husband.

7 Which of the following **best** describes the mood of the article?

A. sad

B. dull

C. lighthearted

D. peaceful

8 In the article, what is the purpose of the words and sentences that the author puts in parentheses?

A. to define terms and words

B. to emphasize certain ideas

C. to explain a difficult concept

D. to provide more information

Write your answer to open-response question 9 in the space provided in your Student Answer Booklet.

9   Describe how Professor Dragoo shows his affection for skunks. Use relevant and specific information from the article to support your answer.

William Shakespeare's The Tragedy of Macbeth *is a story of greed and dangerous ambition. In this soliloquy—one of the most famous passages in English literature—Macbeth, the king of Scotland, has just learned of the death of his wife Lady Macbeth, who had encouraged him in his deadly quest for power. Read the soliloquy and use the information to answer the questions that follow.*

from Macbeth

by William Shakespeare

To-morrow, and to-morrow, and to-morrow,
Creeps in this petty pace from day to day,
To the last syllable of recorded time;
And all our yesterdays have lighted fools
5   The way to dusty death. Out, out, brief candle!
Life's but a walking shadow, a poor player
That struts and frets his hour upon the stage
And then is heard no more: it is a tale
Told by an idiot, full of sound and fury,
10   Signifying nothing.

In the public domain.

10 What is the effect of the repetition in line 1?

    A. It shows that the speaker looks forward to the future.

    B. It emphasizes that each day is the same as the next.

    C. It reminds the audience that time passes without notice.

    D. It expresses curiosity about what the next day will bring.

11 In line 5, what does the metaphor "brief candle" suggest?

    A. The speaker is on his deathbed.

    B. The speaker fears being alone.

    C. The speaker believes life is short.

    D. The speaker prefers darkness to light.

Read the lines from the soliloquy in the box below.

> . . . it is a tale
> Told by an idiot, full of sound and fury,
> Signifying nothing.

12 What does Macbeth mean in these lines?

    A. He believes people should be humble.

    B. He is retelling stories of others.

    C. He believes life has no meaning.

    D. He is surprised that he is still alive.

13 Which of the following is **closest** in meaning to the word *syllable* as it is used in line 3?

    A. song

    B. speech

    C. motion

    D. moment

Poet Theodore Roethke describes a night spent on a train traveling through a remote section of the United States. Read the poem "Night Journey" *to learn what emotional effect the sights and sounds have on him. Answer the questions that follow.*

Night Journey

Now as the train bears west,
Its rhythm rocks the earth,
And from my Pullman berth*
I stare into the night
5 While others take their rest.
Bridges of iron lace,
A suddenness of trees,
A lap of mountain mist
All cross my line of sight,
10 Then a bleak wasted place,
And a lake below my knees.
Full on my neck I feel
The straining at a curve;
My muscles move with steel,
15 I wake in every nerve.
I watch a beacon swing
From dark to blazing bright;
We thunder through ravines
And gullies washed with light.
20 Beyond the mountain pass
Mist deepens on the pane;
We rush into a rain
That rattles double glass.
Wheels shake the roadbed stone,
25 The pistons jerk and shove,
I stay up half the night
To see the land I love.

—*Theodore Roethke*

_____

* *Pullman berth* — a sleeping compartment on a train

14 How does the poet help the reader understand that the view from the train is changing rapidly?

A. by using technical railroad terms

B. by using short lines

C. by using a nighttime setting

D. by using passive voice

15 What does the poet **most likely** mean when he writes "Bridges of iron lace" in line 6?

A. bridges that are cold and fragile

B. bridges that are light and dark

C. bridges that have history and value

D. bridges that have strength and elegance

16 What does the speaker mean when he says in line 14, "My muscles move with steel"?

A. His body feels powerful.

B. He exercises his body.

C. His body responds to the motion.

D. He stretches in his Pullman berth.

17 What idea is conveyed by the shift to the pronoun "we" in lines 18 and 22?

A. The other passengers are waking up.

B. The man and machine are briefly one.

C. The train is increasing its speed.

D. The man is dependent on trains.

Write your answer to open-response question 18 in the space provided in your Student Answer Booklet.

18   Explain how the poem builds to its concluding line. Use relevant and specific information from the poem to support your answer.

English Language Arts
LANGUAGE AND LITERATURE: SESSION 2

DIRECTIONS
This session contains one reading selection with eight multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

In nineteenth century society, the girls in a family were expected to marry according to their age, the oldest first, and so on. This excerpt from Jane Austen's novel, Pride and Prejudice*, describes a party attended by Jane Bennet, her younger sister Elizabeth, and their potential suitors, Mr. Bingley and Mr. Darcy. Read the excerpt and use the information to answer the questions that follow.*

Pride and Prejudice
by Jane Austen

1   Mr. Bingley was good looking and gentlemanlike; he had a pleasant countenance,[1] and easy, unaffected manners. His sisters were fine women, with an air of decided fashion. His brother-in-law, Mr. Hurst, merely looked the gentleman; but his friend Mr. Darcy soon drew the attention of the room by his fine, tall person, handsome features, noble mien;[2] and the report which was in general circulation within five minutes after his entrance, of his having ten thousand[3] a year. The gentlemen pronounced him to be a fine figure of a man, the ladies declared he was much handsomer than Mr. Bingley, and he was looked at with great admiration for about half the evening, till his manners gave a disgust which turned the tide of his popularity; for he was discovered to be proud, to be above his company, and above being pleased; and not all his large estate in Derbyshire could then save him from having a most forbidding, disagreeable countenance, and being unworthy to be compared with his friend.

2   Mr. Bingley had soon made himself acquainted with all the principal people in the room; he was lively and unreserved, danced every dance, was angry that the ball closed so early, and talked of giving one himself at Netherfield.[4] Such amiable qualities must speak for themselves. What a contrast between him and his friend! Mr. Darcy danced only once with Mrs. Hurst and once with Miss Bingley, declined being introduced to any other lady, and spent the rest of the evening in walking about the room, speaking occasionally to one of his own party. His character was decided. He was the proudest, most disagreeable man in the world, and every body hoped that he would never come there again. Amongst the most violent against him was Mrs. Bennet, whose dislike of his general behaviour, was sharpened into particular resentment, by his having slighted one of her daughters.

3   Elizabeth Bennet had been obliged, by the scarcity of gentlemen, to sit down for two dances; and during part of that time, Mr. Darcy had been standing near enough for her to overhear a conversation between him and Mr. Bingley, who came from the dance for a few minutes, to press his friend to join it.

4   "Come, Darcy," said he, "I must have you dance. I hate to see you standing about by yourself in this stupid manner. You had much better dance."

5   "I certainly shall not. You know how I detest it, unless I am particularly acquainted with my partner. At such an assembly as this, it would be insupportable. Your sisters are engaged, and there is not another woman in the room, whom it would not be a punishment to me to stand up with."

6   "I would not be so fastidious as you are," cried Bingley, "for a kingdom! Upon my honour, I never met with so many pleasant girls in my life, as I have this evening; and there are several of them you see uncommonly pretty."

---

[1] *countenance* — facial expression
[2] *mien* — way of behaving that expresses one's personality
[3] *ten thousand* — an income that would make him wealthy in that era
[4] *Netherfield* — Mr. Bingley's home

7   "*You* are dancing with the only handsome girl in the room," said Mr. Darcy, looking at the eldest Miss Bennet.

8   "Oh! she is the most beautiful creature I ever beheld! But there is one of her sisters sitting down just behind you, who is very pretty, and I dare say, very agreeable. Do let me ask my partner to introduce you."

9   "Which do you mean?" and turning round, he looked for a moment at Elizabeth, till catching her eye, he withdrew his own and coldly said, "She is tolerable; but not handsome enough to tempt *me*; and I am in no humour at present to give consequence to young ladies who are slighted by other men. You had better return to your partner and enjoy her smiles, for you are wasting your time with me."

10   Mr. Bingley followed his advice. Mr. Darcy walked off; and Elizabeth remained with no very cordial feelings towards him. She told the story however with great spirit among her friends; for she had a lively, playful disposition, which delighted in any thing ridiculous.

11   The evening altogether passed off pleasantly to the whole family. Mrs. Bennet had seen her eldest daughter much admired by the Netherfield party. Mr. Bingley had danced with her twice, and she had been distinguished by his sisters. Jane was as much gratified by this, as her mother could be, though in a quieter way. Elizabeth felt Jane's pleasure. Mary had heard herself mentioned to Miss Bingley as the most accomplished girl in the neighbourhood; and Catherine and Lydia had been fortunate enough to be never without partners, which was all that they had yet learnt to care for at a ball. They returned therefore in good spirits to Longbourn, the village where they lived, and of which they were the principal inhabitants. They found Mr. Bennet still up. With a book he was regardless of time; and on the present occasion he had a good deal of curiosity as to the event of an evening which had raised such splendid expectations. He had rather hoped that all his wife's views on the stranger would be disappointed; but he soon found that he had a very different story to hear.

12   "Oh! my dear Mr. Bennet," as she entered the room, "we have had a most delightful evening, a most excellent ball. I wish you had been there. Jane was so admired, nothing could be like it. Every body said how well she looked; and Mr. Bingley thought her quite beautiful, and danced with her twice. Only think of *that* my dear; he actually danced with her twice; and she was the only creature in the room that he asked a second time. First of all, he asked Miss Lucas. I was so vexed to see him stand up with her; but, however, he did not admire her at all: indeed, nobody can, you know; and he seemed quite struck with Jane as she was going down the dance. So, he enquired who she was, and got introduced, and asked her for the two next. Then, the two third he danced with Miss King, and the two fourth with Maria Lucas, and the two fifth with Jane again, and the two sixth with Lizzy, and the Boulanger —"[5]

13   "If he had had any compassion for *me*," cried her husband impatiently, "he would not have danced half so much! For God's sake, say no more of his partners. Oh! that he had sprained his ancle in the first dance!"

14   "Oh! my dear," continued Mrs. Bennet, "I am quite delighted with him. He is so excessively handsome! and his sisters are charming women. I never in my life saw any thing more elegant than their dresses. I dare say the lace upon Mrs. Hurst's gown —"

15   Here she was interrupted again. Mr. Bennet protested against any description of finery. She was therefore obliged to seek another branch of the subject, and related, with much bitterness of spirit and some exaggeration, the shocking rudeness of Mr. Darcy.

16   "But I can assure you," she added, "that Lizzy does not lose much by not suiting *his* fancy; for he is a most disagreeable, horrid man, not at all worth pleasing. So high and so conceited that there was no enduring him! He walked here, and he walked there, fancying himself so very great! Not handsome enough to dance with! I wish you had been there, my dear, to have given him one of your set downs. I quite detest the man."

_____

[5] *Boulanger* — a dance

19 According to the excerpt, what was **most** important to Mrs. Bennet during the party?

A. her friends

B. her appearance

C. her daughters

D. her wealth

20 According to the excerpt, which of the following would **best** describe Mr. Bingley?

A. ill-tempered

B. lazy

C. good-natured

D. shy

21 In paragraph 1, what does the word *report* mean?

A. a printed document

B. a detailed statement

C. the result of research

D. the prevailing gossip

22 The narrator notes that Mr. Darcy seems better looking to other guests once they learn he has "ten thousand a year." What is the narrator poking fun at?

A. Darcy's appearance

B. Darcy's friends

C. the guests' shallowness

D. the guests' manners

23 In the excerpt, Mr. Darcy spends **most** of his time doing which of the following?

A. sitting in a corner

B. moving about restlessly

C. getting to know people

D. dancing with suitable women

24 What does Mr. Bingley mean by calling his friend Darcy *fastidious* in paragraph 6?

A. difficult to please

B. concerned with honor

C. obsessed with wealth

D. ready to argue

25 In paragraph 9, why is the word *me* italicized?

A. to emphasize Mr. Darcy's anger

B. to emphasize Mr. Darcy's wealth

C. to emphasize Mr. Darcy's discomfort

D. to emphasize Mr. Darcy's superiority

26 Which word **best** describes Mrs. Bennet's tone in paragraph 12?

A. bored

B. excited

C. annoyed

D. surprised

Write your answer to open-response question 27 in the space provided in your Student Answer Booklet.

27   In this excerpt, how do Mr. Bingley and Mr. Darcy differ from one another, both in the way they view others and in the way others view them? Use relevant and specific information from the excerpt to support your answer.

English Language Arts
LANGUAGE AND LITERATURE: SESSION 3

DIRECTIONS
This session contains two reading selections with twelve multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

Using the proper tools can make any home improvement project easier. However, when painting, many people do not give a second thought to choosing a paintbrush. Quality does make a difference in paintbrushes. To learn more, read this excerpt from a chapter in The Complete Guide to Home Repair and Maintenance *and answer the questions that follow.*

from CHOOSING AND CARING FOR PAINTBRUSHES
by Bernard Gladstone

1 Brushes are still probably the most versatile and useful applicators for home painting. Rollers, pads, and spray cans are faster and easier in many cases, but a brush is still the only painting tool for every surface and almost every kind of house paint (there are some fast-drying commercial and industrial finishes that cannot be applied by brush; they must be sprayed).

2 As with most other tools, a poor-quality brush will make a good job almost impossible—regardless of the quality of the paint or finish applied. On the other hand, a good-quality brush not only will do a much better job, it will last longer and enable you to finish the job faster. So it is really foolish economy to buy cheap "throwaway" brushes simply to save you the job of cleaning the brush afterward—you won't have to clean the brush, but you may very well have to do the whole job over.

3 All good-quality paintbrushes contain a high percentage of bristles with "flagged" or split ends—the more the better. Good-quality Chinese hog bristle is naturally tapered and split at the ends—which is why these bristles were for years considered the best for top-quality paint and varnish brushes. However,

these days most brushes are made of synthetic[1] or man-made bristles, and manufacturers have developed techniques to imitate the flagged and split ends characteristic of natural bristle.

4 Although top-quality Chinese hog bristle works well with most oil-base and synthetic coatings, it is not as suited to water-thinned (latex) paints and finishes. The bristles are porous and absorb water readily, so latex finishes make them swell. This distorts the shape of the brush and ruins its sharp "cutting" edge, and the brush becomes so soft and floppy that smooth application becomes almost impossible. Also, hog bristles tend to wear rapidly on rough surfaces.

5 Nylon bristles, first introduced after World War II when Chinese bristle disappeared from the market, do not lose their springiness in water-thinned paints, and they stand up well on rough surfaces. The better-quality nylon bristles are tapered and flagged for smooth coverage, but nylon tends to soften after a while in hot weather or direct sun. Also, nylon loses much of its springiness in shellac, lacquer, and other quick-drying "synthetic" finishes.

_____

[1] *synthetic* — artificial

119

6   The newest type of synthetic bristle is polyester filament[2]—an extremely versatile material that does not lose its resiliency[3] with the water-thinned (latex) or solvent-thinned (oil, shellac, or lacquer) coatings normally used around the house—including the quick-drying synthetic finishes. In addition, it retains its springiness even in the hottest weather.

7   Like nylon, polyester is made with flagged or split ends to ensure even application of any paint or finish, but it does not quite have nylon's durability on rough, coarse surfaces. To compensate for this, some manufacturers make brushes with a blend of nylon and polyester bristles—nylon around the outside to take the hard wear, and polyester on the inside to provide smooth application and the best working qualities.

8   Here are some other points to check when shopping for a good-quality paintbrush:

1. Hold the brush up to a bright light to see how much of the bristle is flagged or split, and if the bristles are tapered and varied in length.

2. All brushes need some sort of block in the center to provide a "pocket" for holding paint, but some manufacturers use the block as a way of padding out the brush to make it look thicker. Separate the bristles and look down the center to make certain that the block in the middle is not so thick as to deceive you into thinking you are getting a lot more bristles than you actually are.

3. Holding the brush by the handle, press the tips of the bristles against your hand to see if this creates a clean, sharp edge for easy trimming or "cutting." Also, test the bristles for a springy feel and a natural tendency to fan out to a straight edge.

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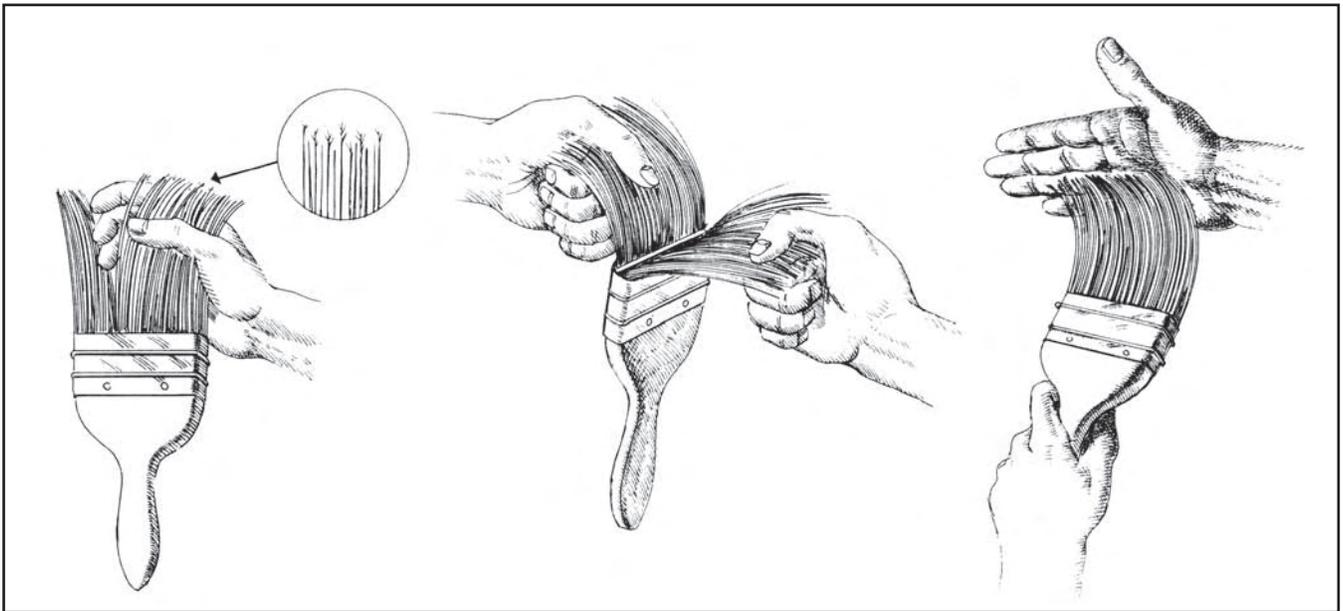
[2] *filament* — a very thin strand
[3] *resiliency* — flexibility; suppleness

4. Select a brush wide enough to minimize the back-and-forth brushing you will have to do, but not so wide and heavy that you can't handle it easily. A $1\frac{1}{2}$-inch or 2-inch brush is generally right for windows and similar narrow trim; a 2-inch or $2\frac{1}{2}$-inch brush is better for baseboards, doorframes, and similar woodwork; a 3-inch brush is about right for doors, cabinets, shelves, and most furniture.

5. Handle sizes and shapes vary, but don't let anyone tell you that one is definitely better than another. When you have a choice, select the handle that feels most comfortable when held in a normal working position.

28 What is the author's purpose in writing this excerpt?

A. to persuade readers to buy only expensive paintbrushes

B. to entertain readers with stories about painting

C. to show readers how to use a paintbrush correctly

D. to inform readers about different kinds of paintbrushes

29 According to the excerpt, why are high-quality paintbrushes better than cheap ones?

A. They do not have to be cleaned as often.

B. They may be discarded after each use.

C. They can be used with both oil- and water-based paints.

D. They are more likely to produce a good paint job.

30 According to the excerpt, what is the advantage of paintbrushes with flagged or split ends?

A. They do not take as long to clean as other brushes.

B. They enable a smoother paint application.

C. They do not absorb water and lose their shape.

D. They contain more bristles than other paintbrushes.

31 According to the excerpt, for which of the following jobs would a Chinese hog bristle brush work **best**?

A. oil paint on a smooth surface

B. oil paint on a rough surface

C. latex paint on a smooth surface

D. latex paint on a rough surface

32 Based on the excerpt, which of the following **best** describes latex paints?

A. top-quality

B. commercial

C. porous

D. water-based

33 According to the excerpt, why do good-quality paintbrushes need to have a center pocket?

A. to hold paint

B. to pad the brush

C. to separate the bristles

D. to make the brush longer

34 According to the excerpt, what is the **best** criterion for selecting a paintbrush handle?

   A. flexibility

   B. comfort

   C. durability

   D. length

35 In the excerpt, why does the author put several words in quotation marks?

   A. to indicate spoken words

   B. to emphasize painting techniques

   C. to emphasize common mistakes

   D. to indicate painting terminology

Write your answer to open-response question 36 in the space provided in your Student Answer Booklet.

36 Explain why the surface to be painted, paint type, and width of brush should be considered when choosing the best paintbrush for a particular paint project. Use relevant and specific information from the excerpt to support your answer.

May Day, the first day of May, is a traditional celebration of springtime that marks the passing of winter. Many cultures mark this occasion with elaborately organized festivities. To learn how the Norsemen of a thousand years ago celebrated May Day, read the Norse myth "The Many Deaths of Winter." *Answer the questions that follow.*

The Many Deaths of Winter

From the Norse myth
Retold by James Baldwin

1   Siegfried, when he came to Gunther's castle, thought of staying there but a few days only. But the king and his brothers made everything so pleasant for their honored guest that weeks slipped by unnoticed, and still the hero remained in Burgundy.

2   Spring had fairly come, and the weeping April clouds had given place to the balmy skies of May. The young men and maidens, as was their custom, made ready for the May-day games; and Siegfried and his knights were asked to take part in the sport.

3   On the smooth greensward, which they called Nanna's carpet, beneath the shade of ash trees and elms, he who played Old Winter's part lingered with his few attendants. These were clad in the dull gray garb which becomes the sober season of the year, and were decked with yellow straw, and dead, brown leaves. Out of the wood came the May king and his followers, clad in the gayest raiment, and decked with evergreens and flowers. With staves[1] and willow withes[2] they fell upon Old Winter's champions and tried to drive them from the sward. In friendly fray they fought, and many mishaps fell to both parties. But at length the May king won; and grave Winter, battered and bruised, was made prisoner, and his followers were driven from the field. Then, in merry sport, sentence was passed on the luckless fellow, for he was found guilty of killing the flowers and of covering the earth with hoar frost;[3] and he was doomed to a long banishment from music and the sunlight. The laughing party then set up a wooden likeness of the worsted[4] winter king, and pelted it with stones and turf; and when they were tired they threw it down and put out its eyes and cast it into the river. And then a pole, decked with wild flowers and fresh green leaves, was planted in the midst of the sward, and all joined in merry dance around it. And they chose the most beautiful of all the maidens to be the Queen of May, and they crowned her with a wreath of violets and yellow buttercups; and for a whole day all yielded fealty[5] to her and did her bidding.[6]

4   It was thus that May Day came in Burgundy.

---

[1] *staves* — narrow strips of wood that form the side of a barrel or tub
[2] *withes* — tough, supple twigs used for binding things together
[3] *hoar frost* — frozen dew that forms a white coating on a surface
[4] *worsted* — defeated
[5] *fealty* — allegiance
[6] *bidding* — a demand that something be done

In the public domain.

37 Which of the following phrases from the myth tells the reader that the games have taken place each year for many years?

A. "weeks slipped by unnoticed" (paragraph 1)

B. "weeping April clouds" (paragraph 2)

C. "as was their custom" (paragraph 2)

D. "the sober season of the year" (paragraph 3)

38 In the myth, what do the flowers symbolize?

A. items of clothing

B. the return of spring

C. items for decoration

D. the return of Siegfried

39 Which of the following **best** explains why the battle in the myth is called a "friendly fray"?

A. Gunther invites Siegfried to take part.

B. The fighting is not meant to hurt anyone.

C. People who know one another have gone to war.

D. Old Winter and the May king know each other well.

40 In the myth, what does the destruction of the wooden likeness of the king symbolize?

A. the death of winter

B. the killing of the flowers

C. the unluckiness of winter

D. the battle between Siegfried and Gunther

Grade 10 English Language Arts
Language and Literature
Spring 2005 Released Items:
Reporting Categories, Standards, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC)*
1	106	*Reading and Literature / Understanding a Text*	8	D
2	106	*Reading and Literature / Nonfiction*	13	A
3	106	*Reading and Literature / Understanding a Text*	8	C
4	106	*Reading and Literature / Understanding a Text*	8	C
5	107	*Reading and Literature / Understanding a Text*	8	B
6	107	*Reading and Literature / Style and Language*	15	D
7	107	*Reading and Literature / Style and Language*	15	C
8	107	*Language / Structure and Origins of Modern English*	5	D
9	108	*Reading and Literature / Nonfiction*	13	
10	110	*Reading and Literature / Style and Language*	15	B
11	110	*Reading and Literature / Style and Language*	15	C
12	110	*Reading and Literature / Style and Language*	15	C
13	110	*Language / Vocabulary and Concept Development*	4	D
14	112	*Reading and Literature / Poetry*	14	B
15	112	*Reading and Literature / Poetry*	14	D
16	112	*Reading and Literature / Poetry*	14	C
17	112	*Reading and Literature / Poetry*	14	B
18	113	*Reading and Literature / Poetry*	14	
19	116	*Reading and Literature / Understanding a Text*	8	C
20	116	*Reading and Literature / Fiction*	12	C
21	116	*Language / Vocabulary and Concept Development*	4	D
22	116	*Reading and Literature / Fiction*	12	C
23	117	*Reading and Literature / Fiction*	12	B
24	117	*Language / Vocabulary and Concept Development*	4	A
25	117	*Reading and Literature / Fiction*	12	D
26	117	*Reading and Literature / Style and Language*	15	B
27	118	*Reading and Literature / Fiction*	12	
28	121	*Reading and Literature / Nonfiction*	13	D
29	121	*Reading and Literature / Understanding a Text*	8	D
30	122	*Reading and Literature / Understanding a Text*	8	B
31	122	*Reading and Literature / Nonfiction*	13	A
32	122	*Language / Vocabulary and Concept Development*	4	D
33	122	*Reading and Literature / Understanding a Text*	8	A
34	123	*Reading and Literature / Understanding a Text*	8	B
35	123	*Language / Formal and Informal English*	6	D
36	123	*Reading and Literature / Nonfiction*	13	
37	125	*Reading and Literature / Myth, Traditional Narrative, and Classical Literature*	16	C
38	125	*Reading and Literature / Style and Language*	15	B
39	125	*Reading and Literature / Understanding a Text*	8	B
40	125	*Reading and Literature / Myth, Traditional Narrative, and Classical Literature*	16	A

* Answers are provided here for multiple-choice items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.

VI. Mathematics, Grade 4

Grade 4 Mathematics Test

The spring 2005 Grade 4 MCAS Mathematics Test was based on learning standards in the Massachusetts *Mathematics Curriculum Framework* (2000). The *Framework* identifies five major content strands, listed below. Page numbers for the grade 3–4 learning standards appear in parentheses.

- Number Sense and Operations (*Framework*, pages 22–23)

- Patterns, Relations, and Algebra (*Framework*, page 32)

- Geometry (*Framework*, page 40)

- Measurement (*Framework*, page 48)

- Data Analysis, Statistics, and Probability (*Framework*, page 56)

The *Mathematics Curriculum Framework* is available on the Department Web site at www.doe.mass.edu/frameworks/math/2000/final.pdf.

In *Test Item Analysis Reports* and on the *Subject Area Subscore* pages of the MCAS *School Reports* and *District Reports*, Mathematics test results are reported under five MCAS reporting categories, which are identical to the five *Framework* content strands listed above.

Test Sessions and Content Overview

The MCAS Grade 4 Mathematics Test included two separate test sessions. Each session included multiple-choice, short-answer, and open-response questions.

Reference Materials and Tools

Each student taking the Grade 4 Mathematics Test was provided with a plastic ruler and a *Grade 4 Mathematics Tool Kit*. A copy of the tool kit follows the final question in this chapter. No calculators, other reference tools, or materials were allowed.

The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only, during both Mathematics test sessions.

Cross-Reference Information

The table at the conclusion of this chapter indicates each item's reporting category and the *Framework* learning standard it assesses. The correct answers for multiple-choice and short-answer questions are also displayed in the table.

Mathematics

SESSION 1

You may use your tool kit and MCAS ruler during this session.
*You may **not** use a calculator during this session.*

DIRECTIONS
This session contains twelve multiple-choice questions, two short-answer questions, and three open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

1 Diego made a spinner to use in a game. He marked each section of the spinner with an even number. Which of the following spinners has an even number marked in each section?

A.

8, 15, 7, 10, 2, 5

B.

6, 20, 4, 18, 2, 8

C.

5, 30, 6, 18, 2, 9

D.

9, 13, 3, 7, 11, 5
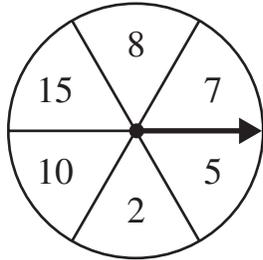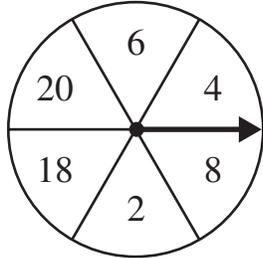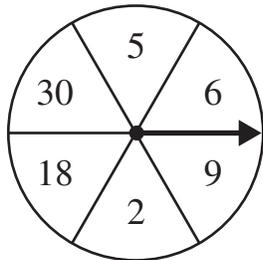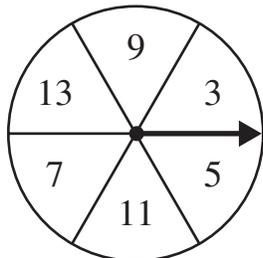
2 Eric bought 2 pairs of mittens and 3 winter scarves.

• Each pair of mittens costs $10.00.
• Each winter scarf costs $5.00.

Which of the following could be used to find the total cost of the mittens and scarves that Eric bought?

A. $(2 + 3) \times (\$10.00 + \$5.00)$

B. $(2 \times \$10.00) + (3 \times \$5.00)$

C. $2 + 3 + \$10.00 + \$5.00$

D. $2 \times 3 \times \$10.00 \times \$5.00$

3 Ms. Roland measured the length of a board she was using to make a shelf. Which of the following could be the length of the board?

A. 6 square feet

B. 6 pounds

C. 6 gallons

D. 6 feet

4 Which of the following is a three-dimensional shape?

A. quadrilateral

B. pyramid

C. triangle

D. rectangle

Use your MCAS ruler to answer question 5.

5 Lysella made the bookmark shown below.
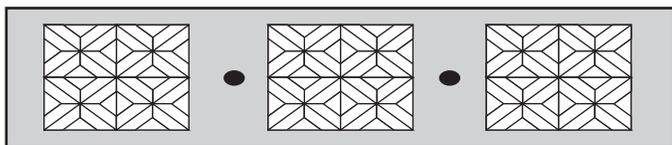
Which of the following is 1 inch **longer** than the bookmark Lysella made?

A.
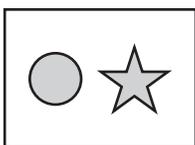
B.
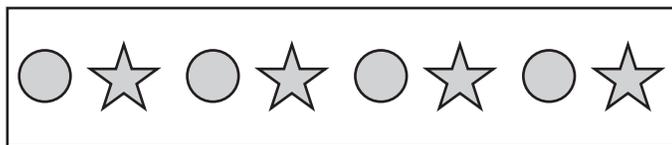
C.
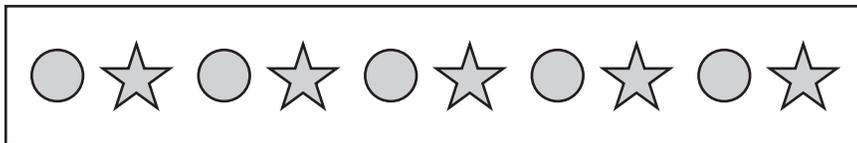
D.
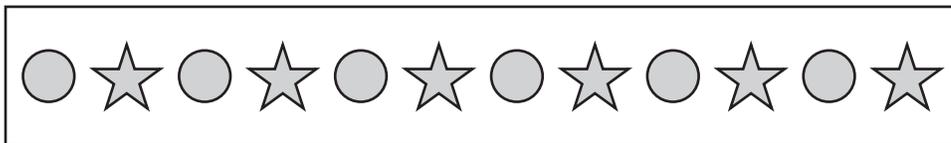
6 The chart below shows the number of college athletes who participated in four different sports in the academic year 1998–1999.

Sports Participation 1998–1999

Sport	Women	Men
Indoor Track	15,460	16,943
Outdoor Track	18,220	20,401
Soccer	17,520	18,238
Basketball	14,365	15,710

According to the chart, how many men and women participated in soccer in 1998–1999?

A. 25,758

B. 33,230

C. 35,758

D. 37,921

7 Which of the following is a true statement?

A. $\frac{1}{2} = 0.12$

B. $\frac{1}{2} = 1.2$

C. $\frac{1}{2} = 0.05$

D. $\frac{1}{2} = 0.5$

8 Each person at Yi Kun's party will choose one of the balloons pictured below. There is a concert ticket hidden inside one of the balloons.
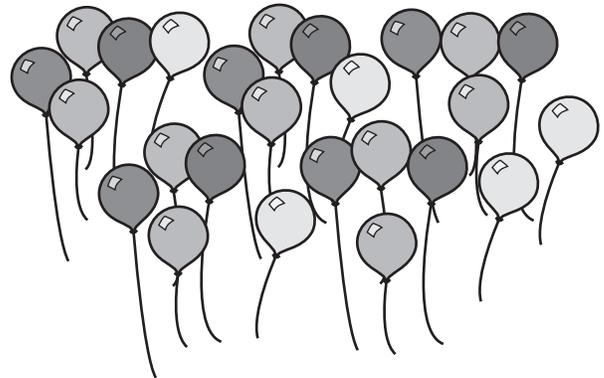
Karl was the first one to choose a balloon. Which of the following best describes the chances that he will choose the balloon with the ticket inside?

A. impossible

B. unlikely

C. likely

D. certain

9 The picture below shows four different cards and the price of each.

$2.75 each

$4.50 each

$2.50 each

$3.25 each
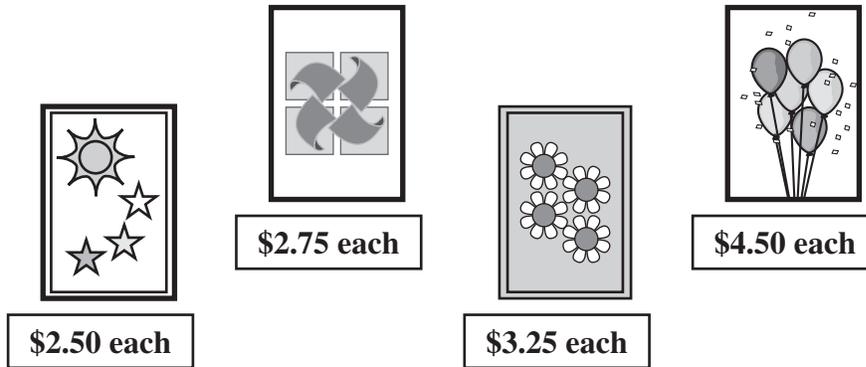
Ms. Erickson bought all 4 cards. What was the total price of all 4 cards?

A. $11.75

B. $12.00

C. $13.00

D. $14.50

Question 10 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

**Write your answer to question 10 in the space provided in your Student Answer Booklet.**

10   Thyra has a rectangular piece of colored paper. The shaded shape on the grid below represents Thyra's piece of paper.

1 in.
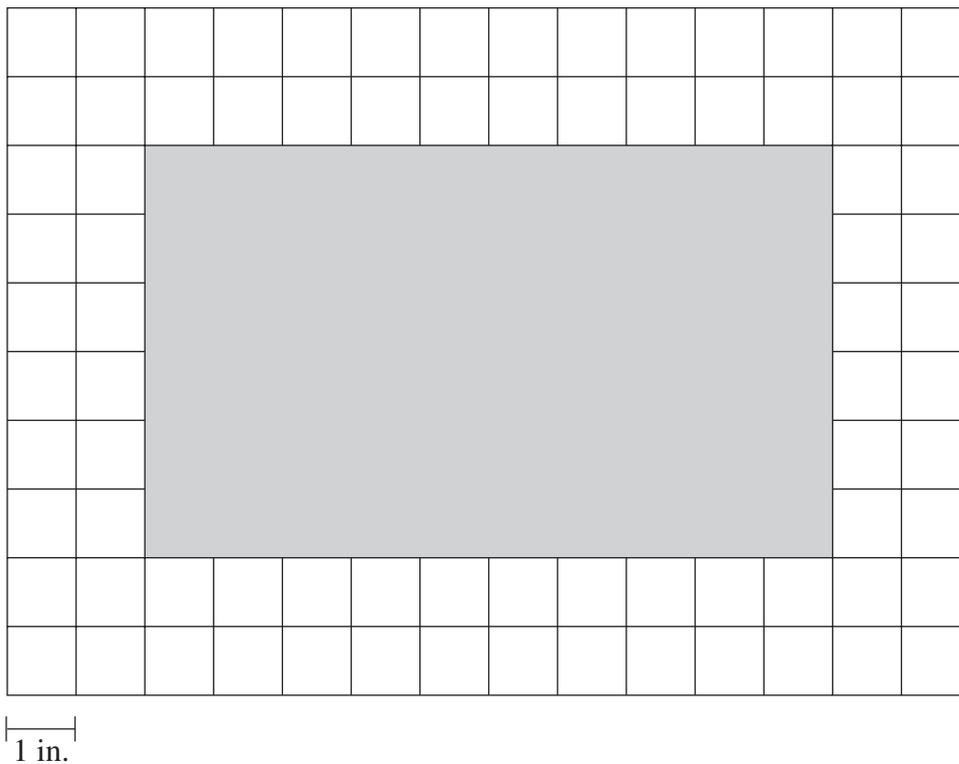
a. What is the area, in square inches, of the piece of paper? Show your work or explain how you got your answer.

b. What is the perimeter, in inches, of the piece of paper? Show your work or explain how you got your answer.

c. Thyra cut the paper into 2 smaller rectangles that were each the same size. What is the perimeter, in inches, of each of the smaller rectangles? Show your work or explain how you got your answer.

Questions 11 and 12 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

11 Both of the scales shown below are balanced.
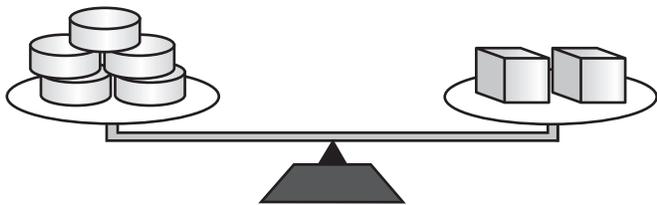
| 5 cans balance 2 blocks. | 4 blocks balance 1 star. |
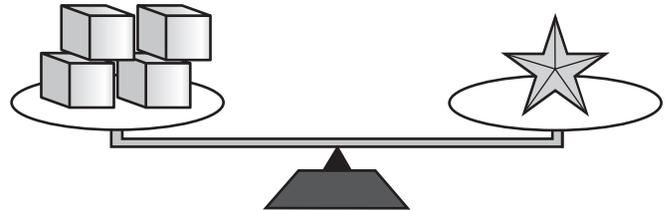
How many cans are needed to balance 1 star?

Use your MCAS ruler to answer question 12.

12 Draw a triangle with 1 obtuse angle.

Question 13 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 13 in the space provided in your Student Answer Booklet.

13 Lark and Elroy are playing a game with a spinner like the one pictured below. All the sections of the spinner are the same size.
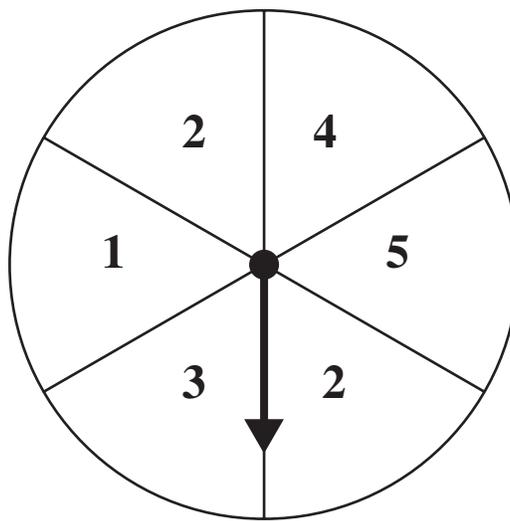
a. If Lark spins the arrow 1 time, what is the probability that the arrow will land on a section labeled with the number 2? Show or explain how you got your answer.

b. If Elroy spins the arrow 1 time, what is the probability that the arrow will land on a section labeled with a number **greater than** 2? Show or explain how you got your answer.

c. Elroy earns a point if the arrow lands on a section labeled with an odd number. Lark earns a point if the arrow lands on a section labeled with an even number. Do Elroy and Lark each have an equal chance of winning, or does one of the players have a better chance of winning than the other? Explain the reason for your answer.

Mark your answers to multiple-choice questions 14 through 16 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

14 All the sections of the models below are the same size.

The model below is shaded to represent 1 whole.
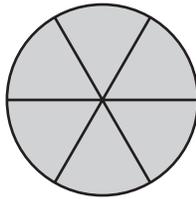
A fractional part of each model below has been shaded. Which fraction should you get if you add the fractions represented by the shaded parts of the models?
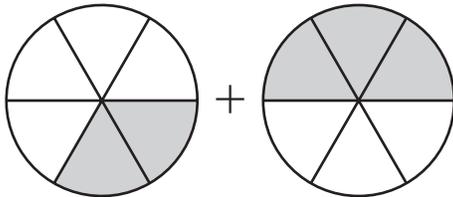
A. $\frac{5}{6}$

B. $\frac{5}{7}$

C. $\frac{5}{12}$

D. $\frac{6}{36}$

15 Which of the following is read "fifty-three hundredths"?

A. 5300

B. 53.00

C. 0.53

D. 0.053

16 What value for △ makes the number sentence shown below true?

$$△ + 4{,}123 = 32{,}085$$

A. 27,962

B. 28,962

C. 32,162

D. 36,208

Question 17 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 17 in the space provided in your Student Answer Booklet.

17 The picture below shows the playing board for the new game show Guess What. In each game, players win points by answering questions about five different categories. Each category has 5 questions to be answered. The number of points that a question is worth is shown on the playing board. (For example, the first question in each category is worth 25 points.)

GUESS WHAT				
States	**People**	**Dates**	**Rivers**	**Books**
25	25	25	25	25
50	50	50	50	50
100	100	100	100	100
200	200	200	200	200
400	400	400	400	400

a. How many points will a player earn if he or she answers all the questions in the "States" category correctly? Show your work or explain how you got your answer.

b. What is the fewest number of questions a player could answer correctly and earn exactly 375 points? Show your work or explain how you got your answer.

c. Mr. Anderson earned exactly 1250 points. He answered more than 5 questions correctly. Show one way that Mr. Anderson could have answered more than 5 questions correctly to earn exactly 1250 points. Explain how you got your answer.

Mathematics

You may use your tool kit and MCAS ruler during this session.
*You may **not** use a calculator during this session.*

DIRECTIONS

This session contains seventeen multiple-choice questions, three short-answer questions, and two open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

18 Max and Sam wrote a number sentence to show that Max is older than Sam. In their number sentence,

- *M* represents Max's age in years, and
- *S* represents Sam's age in years.

Which number sentence shows that Max is older than Sam?

A. $M < S$

B. $M > S$

C. $M = S$

D. $M + S = 10$

19 A factory made 13,424 ice cream sandwiches in an 8-hour period. What is 13,424 rounded to the nearest hundred?

A. 10,000

B. 13,000

C. 13,400

D. 13,500

20 What is the remainder for the division problem shown below?

$$496 \div 6 = ?$$

A. 0

B. 1

C. 3

D. 4

21 Abner's Market has lemons on sale. The table below shows the number of lemons that can be bought for different amounts of money.

Lemon Prices

Number of Lemons	Total Price
10	$1.00
20	$2.00
30	$3.00
40	$4.00
50	$5.00

Based on the information in the table, what happens to the number of lemons each time the total price goes up by $1.00?

A. The number of lemons doubles.

B. The number of lemons is multiplied by 10.

C. The number of lemons increases by 60.

D. The number of lemons increases by 10.

22 Mr. Bingham wrote the correct answer to one of the homework problems on the board, as shown below.
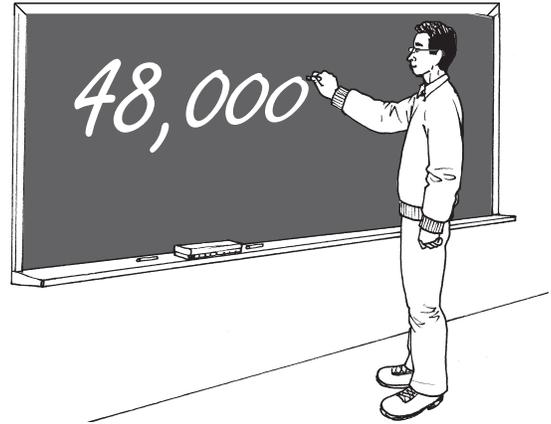
Which of the following could have been the homework problem?

A. 6×800

B. 60×80

C. 60×800

D. 600×8

23 On the first day of school, Ms. Forsythe always asks her students, "How many of you read at least 2 books over the summer?" The graph below shows the data she has collected over the last four years.

Yearly Summer Reading Results
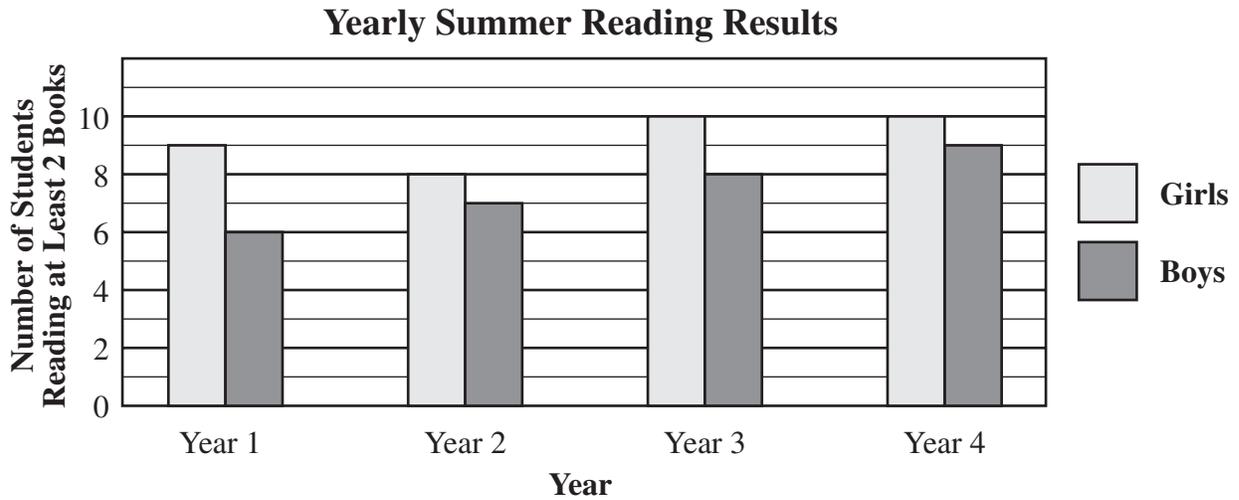
Based on the data in the graph, which of the following is a reasonable conclusion?

A. The number of girls reading at least 2 books increased each year.

B. The number of boys reading at least 2 books increased each year.

C. The number of boys reading at least 2 books in Year 1 is half the number of girls reading at least 2 books in Year 1.

D. The number of students in the class increased each year.

24 The chart below shows the height, in feet, of four different mountains in Colorado.

Mountain Heights

Mountain	Height (in feet)
Mt. Shavano	14,229
Mt. Antero	14,269
Mt. Cameron	14,238
Mt. Wilson	14,246

The height of Mt. Evans is between the two greatest heights shown on the chart above. Which of the following could be the height of Mt. Evans?

A. 14,208 feet

B. 14,241 feet

C. 14,275 feet

D. 14,264 feet

25 Which of the shaded shapes shown below appears to have **exactly** 1 line of symmetry?

A.

B.

C.

D.
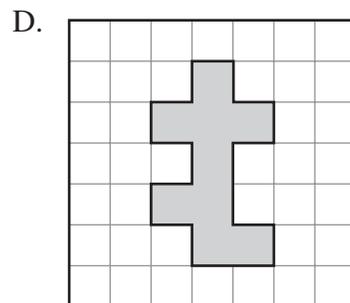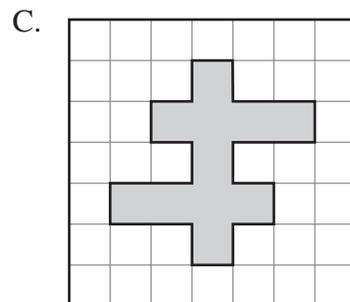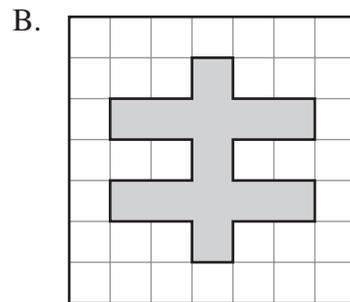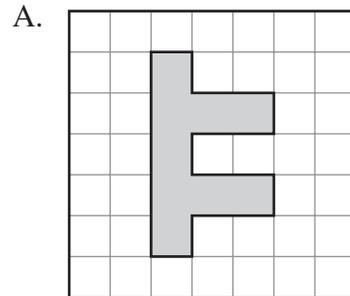
26 One large box of cookies contains the same number of cookies as 6 small boxes. Each small box contains an equal number of cookies. The boxes of cookies are shown below.
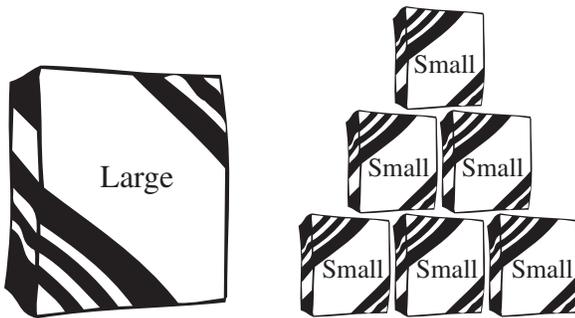
A large box of cookies contains 84 cookies. What is the total number of cookies that a small box contains?

A. 9

B. 11

C. 14

D. 20

Question 27 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 27 in the space provided in your Student Answer Booklet.

27 Lillian used a rule to make the number pattern shown below.

3	7	12	16	21	25	30	?

a. If the pattern continues in the same way, what will be the next number in the pattern? Show or explain how you got your answer.

b. Jenna used the same rule as Lillian to make a number pattern. She began her pattern with the number 10. Should the number 25 be one of the numbers in Jenna's pattern? Show or explain how you got your answer.

Questions 28 and 29 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

28   Tyler has the group of plates shown below. He used exactly $\frac{3}{4}$ of the plates to set the table for a family dinner. How many plates did he use?
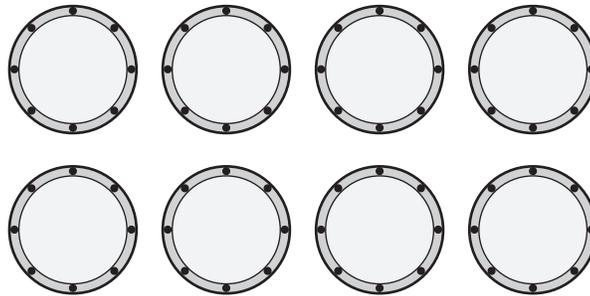
Use your MCAS ruler to answer question 29.

29   What is the perimeter, in inches, of the rectangle shown below?
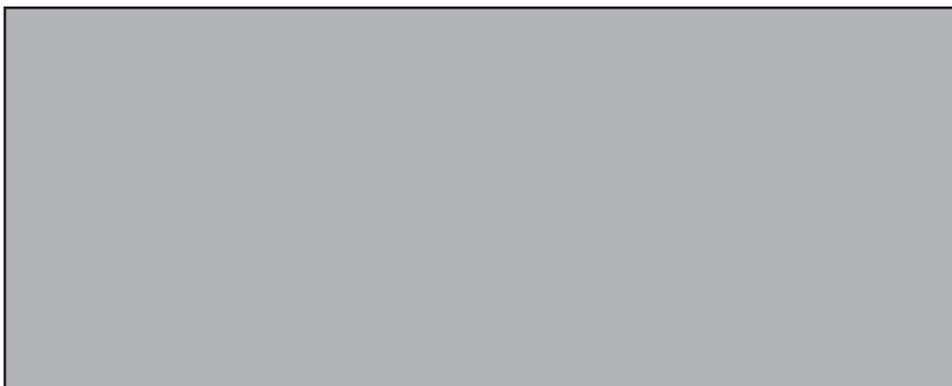
Question 30 is a short-answer question. Write your answer to this question in the box provided in your Student Answer Booklet. Do not write your answer in this test booklet. You may do your figuring in the test booklet.

30 The tally chart below shows the number of red, gold, and orange leaves that Ann collected one weekend.

Leaves Collected

Color	Number Collected
Red	卌 卌 卌 /
Gold	卌 //
Orange	////

How many leaves did Ann collect altogether?

Question 31 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 31 in the space provided in your Student Answer Booklet.

31   Ursula is drawing a map of the area near her school. The first part of her map is shown below. Copy Ursula's map into your Student Answer Booklet. Use your copy of the map to complete the following tasks.
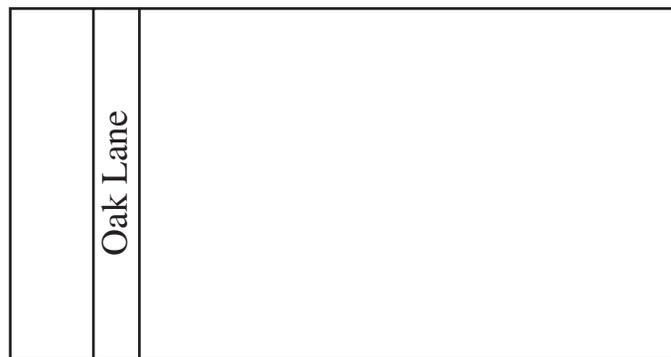
a. Rose Street is perpendicular to Oak Lane. On your map, draw Rose Street so that it is perpendicular to Oak Lane.

b. Shady Glen is parallel to Rose Street. On your map, draw Shady Glen so that it is parallel to Rose Street.

c. Broadway intersects Shady Glen to form an acute angle. Draw Broadway on your map. Mark the acute angle on your map.

Mark your answers to multiple-choice questions 32 through 39 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

32   The chart below shows the votes for class president.

Votes for Class President

Candidate	Number of Votes
Marcia	10
Fred	20
Nick	30
Sally	60

Which graph below most accurately reflects this information?

A.   **Votes for Class President**
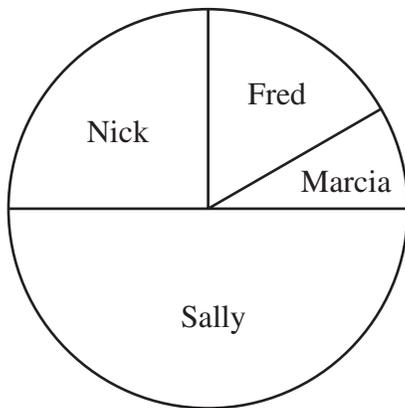
C.   **Votes for Class President**
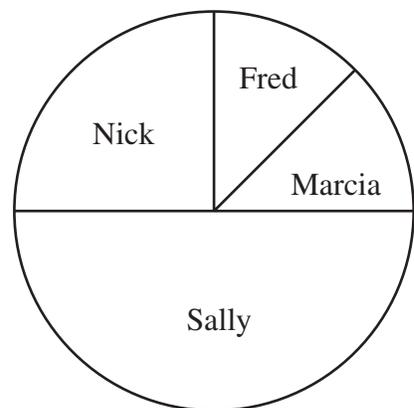
B.   **Votes for Class President**
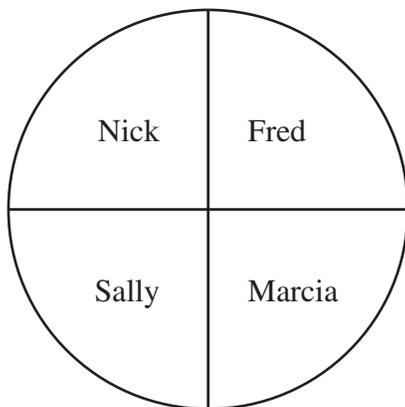
D.   **Votes for Class President**
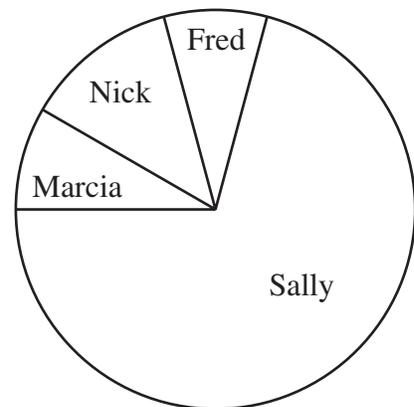
33 Which of the following is a model of 4×3?

A.

B.

C.

D.
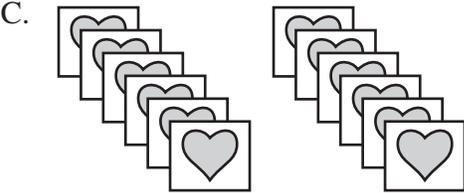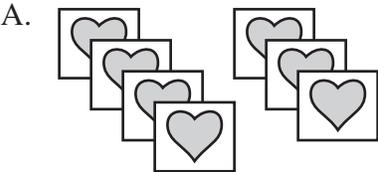
34   Mr. Mitchell is ordering special sweatshirts for his students. The chart below shows his choices for size, color, and pattern.

Choices for Sweatshirts

Size	Color	Pattern
Small Medium Large	White Yellow	Flowers Animals

What is the total number of different combinations of 1 size, 1 color, and 1 pattern that Mr. Mitchell can order?

A. 3

B. 7

C. 12

D. 15

35   The beads on the counting frame shown below represent the number 1,312.
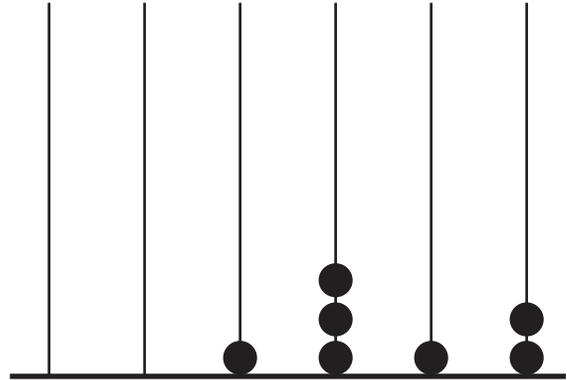
Which number is represented by the beads on the counting frame below?
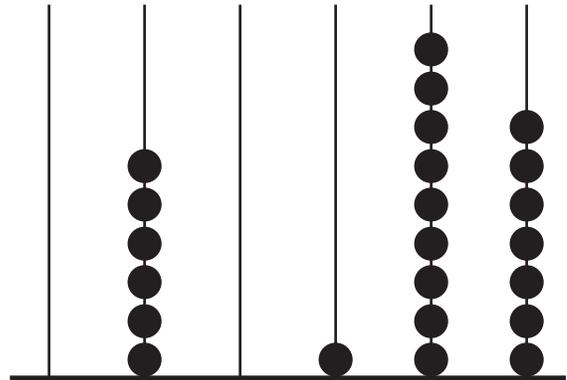
A. 61,097

B. 60,197

C. 6,197

D. 6,097

36 Which of the following is shaded to represent $\frac{1}{8}$ of the circle?

A.
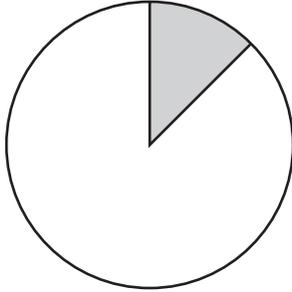
B.
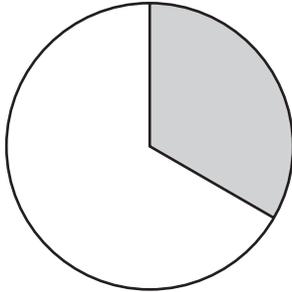
C.
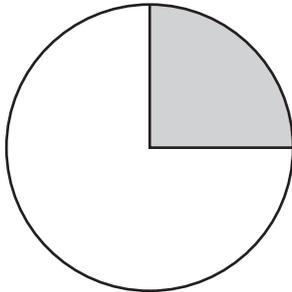
D.
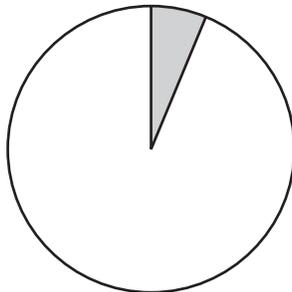
37 Each new number in the pattern shown below was determined by adding the same value to the number just before it.

$$2, 9, 16, 23, \ldots$$

If the pattern continues in the same way, what will be the 8th number?

A. 30

B. 46

C. 51

D. 56

38 Hong wanted to take the 5:10 P.M. bus. She arrived at the bus stop 25 minutes before 5:10 P.M. What time did Hong arrive at the bus stop?

A. 5:35 P.M.

B. 4:45 P.M.

C. 4:40 P.M.

D. 4:25 P.M.

39 Libby planted seeds in each of the identical pots shown below. She planted seeds for pink flowers in 2 of the pots and seeds for yellow flowers in the rest of the pots.
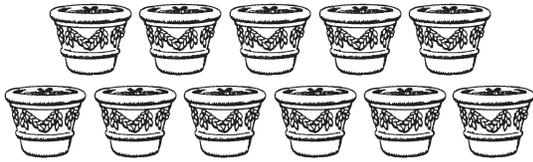
Libby let Amy pick 1 pot. Amy picked her pot without knowing which seeds were planted in it. What is the probability that Amy's pot had seeds for pink flowers in it?

A. $\frac{1}{11}$

B. $\frac{2}{11}$

C. $\frac{2}{9}$

D. $\frac{1}{2}$
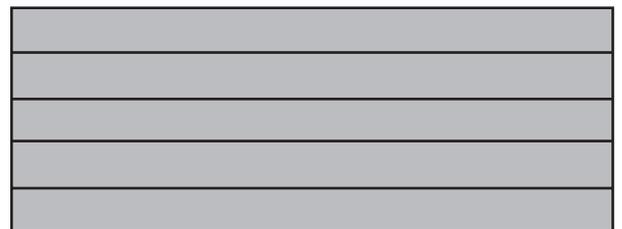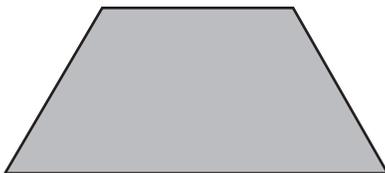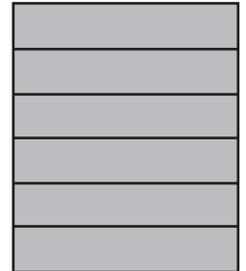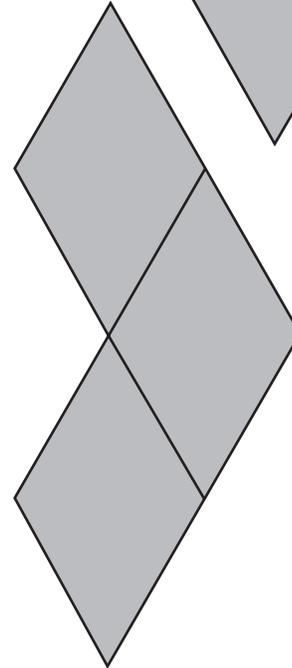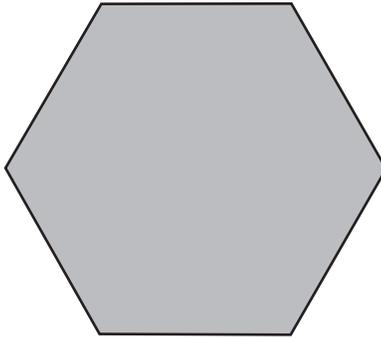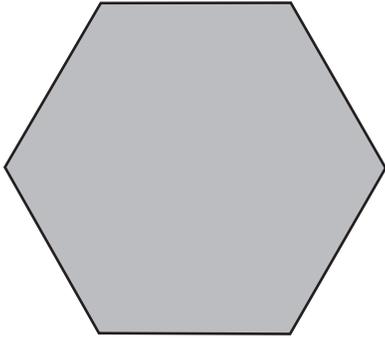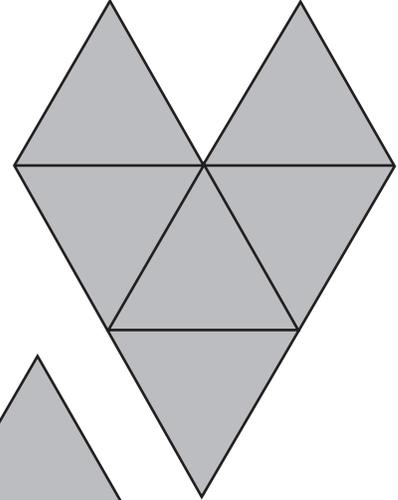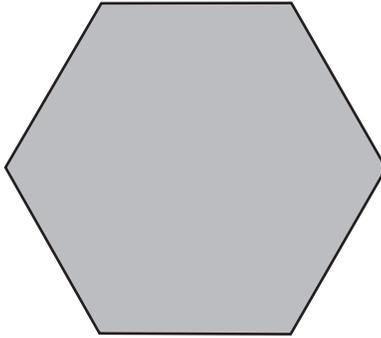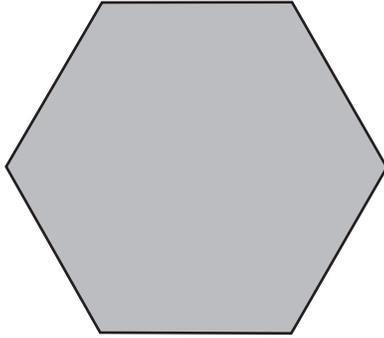
Grade 4 Mathematics
Spring 2005 Released Items:
Reporting Categories, Standards, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC/SA)*
1	129	*Number Sense and Operations*	4.N.7	B
2	129	*Patterns, Relations, and Algebra*	4.P.4	B
3	130	*Measurement*	4.M.1	D
4	130	*Geometry*	4.G.2	B
5	131	*Measurement*	4.M.5	C
6	132	*Number Sense and Operations*	4.N.12	C
7	132	*Number Sense and Operations*	4.N.5	D
8	132	*Data Analysis, Statistics, and Probability*	4.D.6	B
9	133	*Number Sense and Operations*	4.N.10	C
10	134	*Measurement*	4.M.4	
11	135	*Patterns, Relations, and Algebra*	4.P.5	10
12	135	*Geometry*	4.G.2	drawing of any triangle with 1 obtuse angle
13	136	*Data Analysis, Statistics, and Probability*	4.D.4	
14	137	*Number Sense and Operations*	4.N.18	A
15	137	*Number Sense and Operations*	4.N.6	C
16	137	*Patterns, Relations, and Algebra*	4.P.3	A
17	138	*Number Sense and Operations*	4.N.9	
18	139	*Patterns, Relations, and Algebra*	4.P.2	B
19	139	*Number Sense and Operations*	4.N.16	C
20	139	*Number Sense and Operations*	4.N.13	D
21	140	*Patterns, Relations, and Algebra*	4.P.6	D
22	140	*Number Sense and Operations*	4.N.11	C
23	141	*Data Analysis, Statistics, and Probability*	4.D.3	B
24	142	*Number Sense and Operations*	4.N.1	D
25	142	*Geometry*	4.G.8	A
26	143	*Patterns, Relations, and Algebra*	4.P.5	C
27	144	*Patterns, Relations, and Algebra*	4.P.1	
28	145	*Number Sense and Operations*	4.N.3	6
29	145	*Measurement*	4.M.4	14 inches
30	146	*Data Analysis, Statistics, and Probability*	4.D.3	27
31	147	*Geometry*	4.G.5	
32	148	*Data Analysis, Statistics, and Probability*	4.D.2	A
33	149	*Number Sense and Operations*	4.N.8	D
34	150	*Data Analysis, Statistics, and Probability*	4.D.5	C
35	150	*Number Sense and Operations*	4.N.1	B
36	151	*Number Sense and Operations*	4.N.3	A
37	151	*Patterns, Relations, and Algebra*	4.P.1	C
38	151	*Measurement*	4.M.3	B
39	152	*Data Analysis, Statistics, and Probability*	4.D.4	B

* Answers are provided here for multiple-choice and short-answer items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.

VII. Mathematics, Grade 6

Grade 6 Mathematics Test

The spring 2005 Grade 6 MCAS Mathematics Test was based on learning standards in the Massachusetts *Mathematics Curriculum Framework* (2000). The *Framework* identifies five major content strands, listed below. Page numbers for the grade 5–6 learning standards appear in parentheses.

- ❚ Number Sense and Operations (*Framework*, pages 25–26)

- ❚ Patterns, Relations, and Algebra (*Framework*, page 34)

- ❚ Geometry (*Framework*, page 42)

- ❚ Measurement (*Framework*, page 50)

- ❚ Data Analysis, Statistics, and Probability (*Framework*, page 58)

The *Mathematics Curriculum Framework* is available on the Department Web site at www.doe.mass.edu/frameworks/math/2000/final.pdf.

In *Test Item Analysis Reports* and on the *Subject Area Subscore* pages of the MCAS *School Reports* and *District Reports*, Mathematics test results are reported under five MCAS reporting categories, which are identical to the five *Mathematics Curriculum Framework* content strands listed above.

Test Sessions and Content Overview

The MCAS Grade 6 Mathematics Test included two separate test sessions. Each session included multiple-choice, short-answer, and open-response questions.

Reference Materials and Tools

Each student taking the Grade 6 Mathematics Test was provided with a plastic ruler and a *Grade 6 Mathematics Reference Sheet*. A copy of the reference sheet follows the final question in this chapter. No calculators, other reference tools, or materials were allowed.

The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only, during both Mathematics test sessions.

Cross-Reference Information

The table at the conclusion of this chapter indicates each item's reporting category and the *Framework* learning standard it assesses. The correct answers for multiple-choice and short-answer questions are also displayed in the table.

Mathematics

SESSION 1

You may use your reference sheet and MCAS ruler during this session.
*You may **not** use a calculator during this session.*

DIRECTIONS
This session contains twelve multiple-choice questions, two short-answer questions, and three open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

1 Bonnie bought a 13-pound turkey for $0.85 per pound. How much money did she pay for the turkey?

A. $11.05

B. $13.85

C. $33.00

D. $110.05

2 The table below shows the number of pounds of fertilizer needed to cover a given area.

Fertilizer Coverage

Pounds	Square Yards of Coverage
4	100
8	200
12	300
16	400

Based on the pattern in the table, how many pounds of fertilizer are needed to cover 600 square yards?

A. 18 pounds

B. 20 pounds

C. 24 pounds

D. 25 pounds

3 Which of the following is closest to the distance between point *A* and point *B* on the number line shown below?

A   B

200   300   400   500
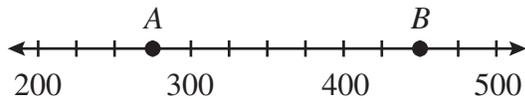
A. 175 units

B. 275 units

C. 450 units

D. 725 units

4 A sea otter has over 1,000,000 hairs per square inch on its back. Which of the following equals 1,000,000?

A. 10^5

B. 10^6

C. 10^7

D. 10^8

5 Which of the following is closest to the product 298.7×10.1?

A. 300

B. 2,000

C. 3,000

D. 20,000

6 What value of *x* makes the equation shown below true?

$$2x + 2 = 10$$

A. $x = 4$

B. $x = 6$

C. $x = 8$

D. $x = 12$

7 Rae is making a salad. The choices for the ingredients are shown in the chart below.

Salad Ingredients

Lettuce	Vegetable	Dressing
Iceberg	Carrot	Ranch
Romaine	Celery	Italian
	Broccoli	Caesar
	Cauliflower	Vinaigrette
		French

What is the total number of different salads she can make using one lettuce, one vegetable, and one dressing?

A. 11

B. 15

C. 20

D. 40

8 Judith has a total of 8 fish in her aquarium. Exactly 6 of the fish are guppies. What percent of the fish in the aquarium are guppies?

A. 48%

B. 60%

C. 68%

D. 75%

9 Sam is 37 years older than Dennis. If Sam is 55 years old now, how old is Dennis?

A. 12 years old

B. 18 years old

C. 28 years old

D. 92 years old

Question 10 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 10 in the space provided in your Student Answer Booklet.

10   On the grid in your Student Answer Booklet, create a coordinate grid like the one shown below.
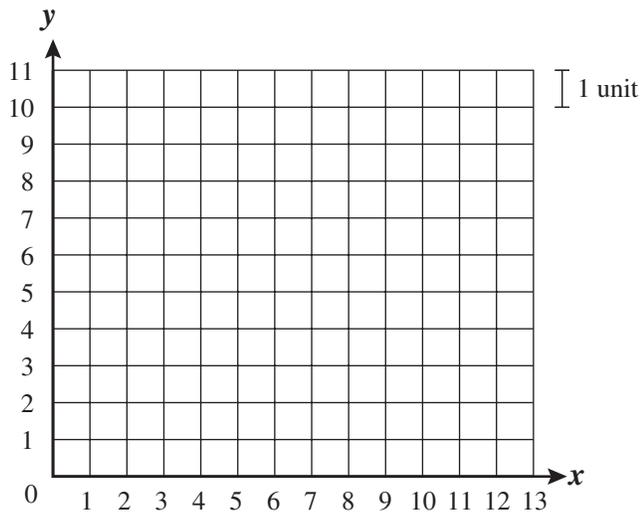
a. On your coordinate grid, plot the point (4, 3). Label the point *A*.

b. On your coordinate grid, plot the point (4, 9). Label the point *B*.

c. The points *A* and *B* will be used to form a triangle.

- On your coordinate grid, plot and label a third point, *C*, so that a right isosceles triangle will be formed when points *A*, *B*, and *C* are connected.

- What are the coordinates of point *C*?

- Explain how you know that the triangle formed is **both** right and isosceles.

d. What is the area, in square units, of triangle *ABC*? Show or explain how you got your answer.

Questions 11 and 12 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

11 What is the value of the following expression?

$$3 + 6 \times 4$$

12 The radius of a circle is 14 inches. What is the diameter of the circle?

**Question 13 is an open-response question.**

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 13 in the space provided in your Student Answer Booklet.

13 The local library charges the same fine per day for each day a library book is overdue. The table below shows the amount of the fine for a book that is overdue for different numbers of days.

Fines for Overdue Library Books

Number of Days Overdue	Amount of Fine
2	$0.30
4	$0.60
6	$0.90
⋮	⋮
18	

a. What is the amount of the fine for a book that is 1 day overdue? Show or explain how you got your answer.

b. What will be the amount of the fine for a book that is 18 days overdue? Show or explain how you got your answer.

c. Using numbers, words, or symbols, write an expression that represents the amount of the fine for a book that is x days overdue.

d. What is the fewest number of days a book can be overdue if the amount of the fine is greater than $14.00? Show or explain how you got your answer.

Mark your answers to multiple-choice questions 14 through 16 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

14 What is the value of the expression below when $\triangle = 8$?

$$\frac{\triangle}{2} - 2$$

A. 2

B. 3

C. 4

D. 6

15 Mr. Young wrote five numbers on the board in his classroom. After class, one of the numbers was erased. Four of the five numbers are shown below.

18   25   30   17   _?_

If the median of the five numbers that Mr. Young wrote on the board was 18, which of the following could be true?

A. The number that was erased was greater than 30.

B. The mode of the five numbers Mr. Young wrote on the board was 24.

C. The mean of the five numbers Mr. Young wrote on the board was 22.6.

D. The number that was erased was less than or equal to 18.

16 There are 11 teachers and 132 students at a middle school. What is the ratio of teachers to students?

A. 1 to 11

B. 1 to 12

C. 11 to 12

D. 11 to 13

163

Question 17 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 17 in the space provided in your Student Answer Booklet.

17   Shing made the design shown below using gray square tiles and white square tiles.
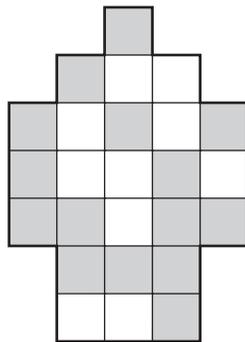
	Key
▨	represents 1 gray tile
☐	represents 1 white tile

a. What fractional part of the whole design is made up of gray tiles? Write your answer as a fraction. Show or explain how you got your answer.

b. Write the fraction from part a. as a decimal. Show or explain how you got your answer.

c. Write the fraction from part a. as a percent. Show or explain how you got your answer.

Mathematics

*You may use your reference sheet and MCAS ruler during this session.
You may **not** use a calculator during this session.*

DIRECTIONS

This session contains seventeen multiple-choice questions, three short-answer questions, and two open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

18 Mr. Donato drew an equilateral triangle. Which of the following statements is true about the triangle?

  A. At least one angle is obtuse.

  B. All of the angles are acute.

  C. At least one angle measures 90 degrees.

  D. All of the angles have different measurements.

19 Bridget created the input-output table shown below.

Input	1	2	3	4	5	6	7
Output	4	6	8	10	12	14	16

Which of the following rules is true for all values in Bridget's input-output table?

  A. Input $+$ 3 $=$ Output

  B. Input $\times$ 3 $=$ Output

  C. (Input $\times$ 2) $+$ 1 $=$ Output

  D. (Input $\times$ 2) $+$ 2 $=$ Output

20 Marta is plotting points on the number line below.
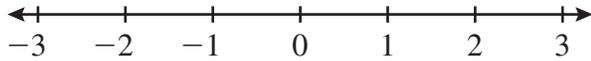
Between which two numbers should Marta plot $-2\frac{1}{2}$?

A.   1 and 2

B.   2 and 3

C. -2 and -1

D. -3 and -2

21 What is the area of the triangle shown below?
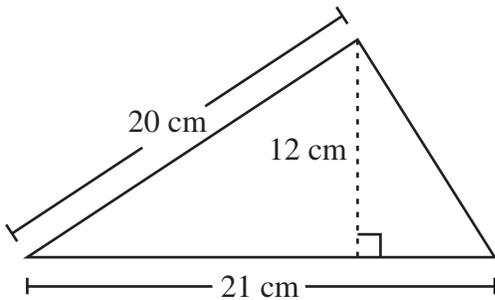
A.   126 cm²

B.   210 cm²

C.   252 cm²

D.   420 cm²

22 Based on the equation below, which of the following statements must be true?

$$3(\Delta) = 12$$

A. $\Delta = 3 + 12$

B. $\Delta = 12 - 3$

C. $\Delta = 12 \div 3$

D. $\Delta = 3 \div 12$

23 Which of the following shows the numbers in order from **least** to **greatest**?

A. 0.765,   0.82,   0.791

B. 0.765,   0.791,   0.82

C. 0.791,   0.82,   0.765

D. 0.791,   0.765,   0.82

24 What is the value of the expression shown below?

$$-6 + (-9)$$

A. -15

B. -3

C. 3

D. 15

25 Which of the following represents the statement "3 times the sum of 2 and 4"?

A. $3 \times 2 + 4$

B. $3 + (2 \times 4)$

C. $3 \times 4 + 2$

D. $3 \times (2 + 4)$

26 The stem-and-leaf plot below shows the number of minutes each of Ms. Dena's students spent practicing the piano on Monday night.

Minutes Spent Practicing

1	0 0
2	5 8
3	0 0 5 7
4	5 9

Key
6	5 represents 65

Each student's assignment was to practice **at least** 30 minutes on Monday night. What is the total number of students who completed their assignment?

A. 4

B. 6

C. 8

D. 10

Question 27 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 27 in the space provided in your Student Answer Booklet.

27 Mattias has a rectangular prism with the dimensions shown below.

10 cm

4 cm

5 cm
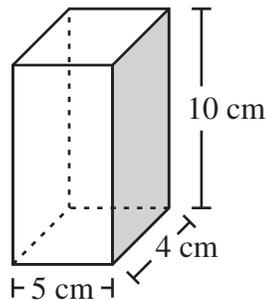
a. What is the area, in square centimeters, of the shaded face of the rectangular prism? Show or explain how you got your answer.

b. What is the volume, in cubic centimeters, of the rectangular prism? Show or explain how you got your answer.

c. What is the total surface area, in square centimeters, of the rectangular prism? Show or explain how you got your answer.

Questions 28 and 29 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

28   Based on the pattern in the input-output table below, what is the value of *y* when *x* = 4?

Input (x)	Output (y)
1	7
2	14
3	21
4	?

29   Ticket sales for the sixth-grade banquet are shown in the table below.

Banquet Tickets Sold

Homeroom	Number of Tickets Sold
Ms. Sanchez	22
Ms. Blake	28
Mr. Chang	21
Mr. Williams	25

What is the **mean** number of tickets sold per homeroom?

Question 30 is a short-answer question. Write your answer to this question in the box provided in your Student Answer Booklet. Do not write your answer in this test booklet. You may do your figuring in the test booklet.

30   Lines *w*, *x*, *y*, and *z* are shown below.
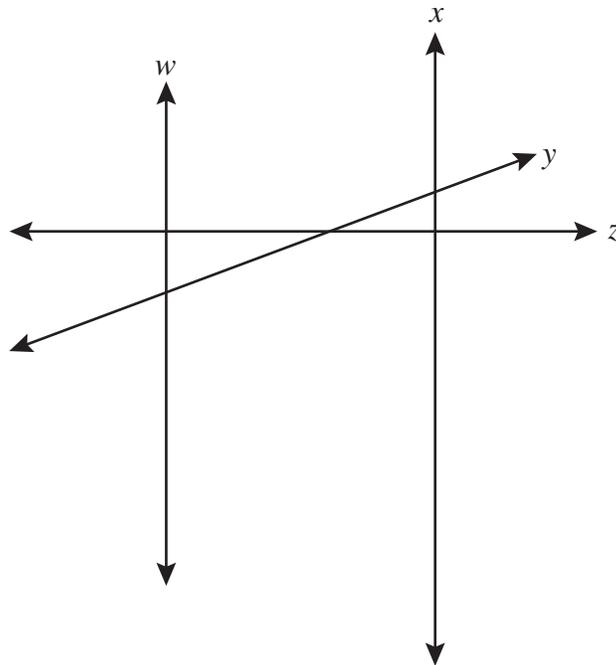
What are 2 lines that appear to be perpendicular to each other?

Question 31 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 31 in the space provided in your Student Answer Booklet.

31 Silas has the cards shown below. All cards are the same size and shape. He put the cards into a bag.
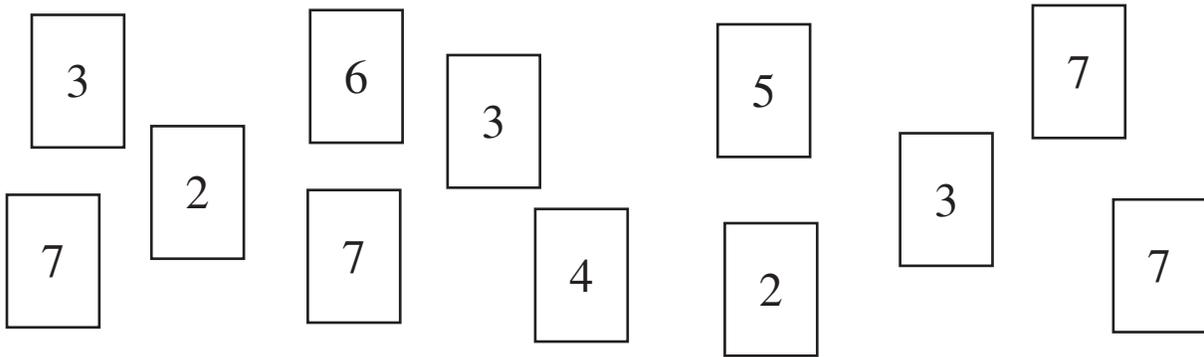
Silas will pull one card out of the bag without looking.

a. Will the number on the card Silas pulls out more likely be an even number or more likely be an odd number? Show or explain how you got your answer.

b. What is the probability that the card Silas pulls out will have a 3 on it? Show or explain how you got your answer.

c. Silas will perform this experiment a total of 72 times, replacing the card after each pull. What is the total number of times he should expect to pull out a card with a 7 on it? Show or explain how you got your answer.

Mark your answers to multiple-choice questions 32 through 39 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

32 Each jar below contains an equal number of coins.
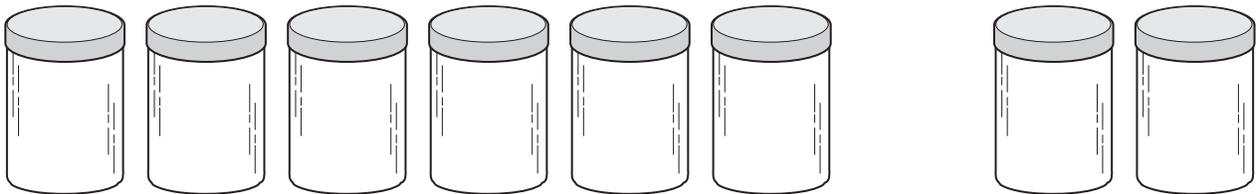
The total number of coins in 6 of the 8 jars is 54. How many coins are in all 8 jars?

A. 24

B. 61

C. 72

D. 324

33 Arnie wrote the number pattern below.

                1, 2, 5, 14, 41

If the pattern continues in the same way, which of the following rules can Arnie use to find the next number in the number pattern?

A. Add 1.

B. Multiply by 2.

C. Multiply by 2; then add 1.

D. Multiply by 3; then subtract 1.

34 Which of the following shows one hundred four thousand, six hundred twenty-nine and four hundredths written in standard form?

A. 104,629.004

B. 104,629,400

C. 104,629.04

D. 104,629.4

35 Julian is drawing a rectangle on the coordinate grid below. Each vertex of his rectangle will have whole number coordinates. Vertices *A*, *B*, and *C* of the rectangle are shown on the grid.
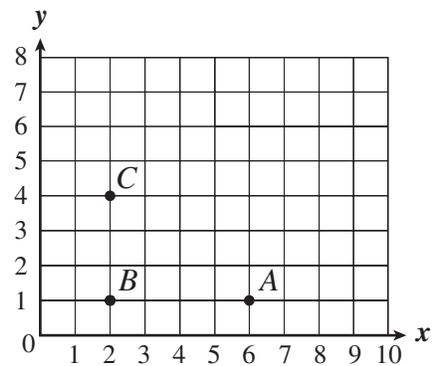
Julian will graph the point *D* to complete the rectangle. What are the coordinates of point *D*?

A. (4, 6)

B. (5, 5)

C. (6, 4)

D. (6, 5)

36 Mariatu drew the figure shown on the grid below.
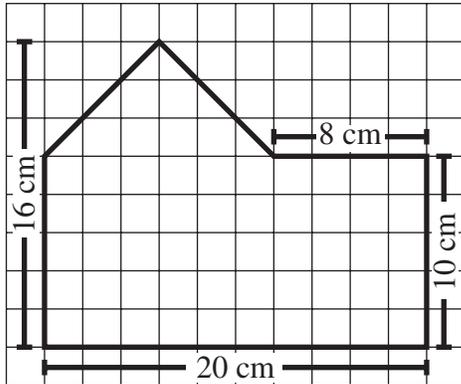
What is the area of the entire figure?

A. 320 cm²

B. 236 cm²

C. 200 cm²

D. 72 cm²

37 The Gupta family uses 20 to 25 plums to make a jar of preserves. Which of the following is closest to the number of jars of preserves they can make using a total of 3700 plums?

A. 17 jars

B. 85 jars

C. 170 jars

D. 340 jars

38 What is the value of the expression below when $x = 16$?

$$2x + 15$$

A. 31

B. 33

C. 47

D. 62

39   Jared bought bags of large pretzels at the food store. The graph below represents the relationship between the number of bags he bought and the total number of pretzels in the bags.

**Total Number of Pretzels
in Bags Jared Bought**
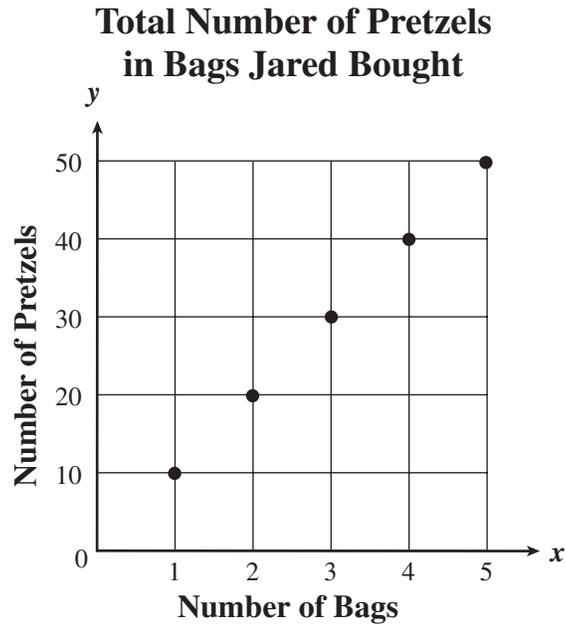
Based on the graph, what is the relationship between the number of bags and the total number of pretzels in the bags?

A. Total Number of Pretzels $= 10 \times$ Number of Bags

B. Total Number of Pretzels $= 10 +$ Number of Bags

C. Total Number of Pretzels $= 10 -$ Number of Bags

D. Total Number of Pretzels $= 10 \div$ Number of Bags

AREA FORMULAS

square ....$A = s{\cdot}s$

OR

$A = lw$

rectangle.................$A = bh$

OR

$A = lw$

parallelogram ....$A = bh$

triangle ....$A = \dfrac{1}{2}bh$

PERIMETER FORMULAS

perimeter = distance around

square ....$P = 4s$

rectangle.................$P = 2b + 2h$

OR

$P = 2l + 2w$

triangle ....$P = a + b + c$

VOLUME FORMULAS

rectangular prism ....$V = lwh$

cube ....$V = s{\cdot}s{\cdot}s$
(s = length of an edge)

CIRCLE FORMULAS

$C = 2\pi r$

OR

$C = \pi d$

$A = \pi r^2$

CONVERSIONS

3 feet = 1 yard

5280 feet = 1 mile

60 seconds = 1 minute

60 minutes = 1 hour

Grade 6 Mathematics
Spring 2005 Released Items:
Reporting Categories, Standards, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC/SA)*
1	157	*Number Sense and Operations*	6.N.13	A
2	157	*Patterns, Relations, and Algebra*	6.P.1	C
3	158	*Geometry*	6.G.5	A
4	158	*Number Sense and Operations*	6.N.1	B
5	158	*Number Sense and Operations*	6.N.16	C
6	158	*Patterns, Relations, and Algebra*	6.P.5	A
7	159	*Data Analysis, Statistics, and Probability*	6.D.3	D
8	159	*Number Sense and Operations*	6.N.5	D
9	159	*Number Sense and Operations*	6.N.12	B
10	160	*Geometry*	6.G.4	
11	161	*Number Sense and Operations*	6.N.11	27
12	161	*Measurement*	6.M.5	28 inches
13	162	*Patterns, Relations, and Algebra*	6.P.4	
14	163	*Patterns, Relations, and Algebra*	6.P.2	A
15	163	*Data Analysis, Statistics, and Probability*	6.D.1	D
16	163	*Number Sense and Operations*	6.N.4	B
17	164	*Number Sense and Operations*	6.N.5	
18	165	*Geometry*	6.G.1	B
19	165	*Patterns, Relations, and Algebra*	6.P.4	D
20	166	*Number Sense and Operations*	6.N.6	D
21	166	*Measurement*	6.M.4	A
22	166	*Patterns, Relations, and Algebra*	6.P.3	C
23	166	*Number Sense and Operations*	6.N.7	B
24	167	*Number Sense and Operations*	6.N.15	A
25	167	*Patterns, Relations, and Algebra*	6.P.4	D
26	167	*Data Analysis, Statistics, and Probability*	6.D.2	B
27	168	*Measurement*	6.M.6	
28	169	*Patterns, Relations, and Algebra*	6.P.4	28
29	169	*Data Analysis, Statistics, and Probability*	6.D.1	24
30	170	*Geometry*	6.G.3	line z and line w, or line z and line x
31	171	*Data Analysis, Statistics, and Probability*	6.D.4	
32	172	*Number Sense and Operations*	6.N.9	C
33	172	*Patterns, Relations, and Algebra*	6.P.1	D
34	173	*Number Sense and Operations*	6.N.2	C
35	173	*Geometry*	6.G.4	C
36	174	*Measurement*	6.M.4	B
37	174	*Number Sense and Operations*	6.N.16	C
38	174	*Patterns, Relations, and Algebra*	6.P.2	C
39	175	*Patterns, Relations, and Algebra*	6.P.6	A

* Answers are provided here for multiple-choice and short-answer items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.

VIII. Mathematics, Grade 8

Grade 8 Mathematics Test

The spring 2005 Grade 8 MCAS Mathematics Test was based on learning standards in the Massachusetts *Mathematics Curriculum Framework* (2000). The *Framework* identifies five major content strands, listed below.

- ❚ Number Sense and Operations
- ❚ Patterns, Relations, and Algebra
- ❚ Geometry
- ❚ Measurement
- ❚ Data Analysis, Statistics, and Probability

The grade 7–8 learning standards for each of these strands appear on pages 62–66 of the *Mathematics Curriculum Framework*, which is available on the Department Web site at www.doe.mass.edu/frameworks/math/2000/final.pdf.

In *Test Item Analysis Reports* and on the *Subject Area Subscore* pages of the MCAS *School Reports* and *District Reports*, Mathematics test results are reported under five MCAS reporting categories, which are identical to the five *Framework* content strands listed above.

Test Sessions and Content Overview

The MCAS Grade 8 Mathematics Test included two separate test sessions. Each session included multiple-choice and open-response questions. Session 1 also included short-answer questions.

Reference Materials and Tools

Each student taking the Grade 8 Mathematics Test was provided with a plastic ruler and a *Grade 8 Mathematics Reference Sheet*. A copy of the reference sheet follows the final question in this chapter.

During session 2, each student had sole access to a calculator with at least four functions and a square root key. Calculator use was not allowed during session 1. No other reference tools or materials were allowed.

The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only, during both Mathematics test sessions.

Cross-Reference Information

The table at the conclusion of this chapter indicates each item's reporting category and the *Framework* learning standard it assesses. The correct answers for multiple-choice and short-answer questions are also displayed in the table.

Mathematics

SESSION 1

You may use your reference sheet and MCAS ruler during this session.
*You may **not** use a calculator during this session.*

DIRECTIONS

This session contains fifteen multiple-choice questions, five short-answer questions, and two open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

1 Noel is a computer repairman. To fix a computer, he charges a customer $40 per hour, plus a fixed fee of $15 for the service call, as represented by the equation below.

$$y = 40x + 15$$

In the equation, what is represented by the variable x?

A. the number of hours Noel worked

B. the amount Noel charged per hour

C. the fixed fee for the service call

D. the total cost of the repair job

2 If $x = 2$ and $y = 4$, what is the value of the following expression?

$$x - 5y$$

A. -18

B. -12

C. 12

D. 18

3 The stem-and-leaf plot below shows the number of people using a skateboard park on 13 different days.

Number of Skateboard Park Users

3	0 2
4	2 3 5 6
5	1 4 4 6
6	1 2 4

Key
4 │ 3 represents 43

What is the range of the data in the stem-and-leaf plot?

A. 29

B. 31

C. 32

D. 34

4   The coordinate grid below shows the graphs of two lines: line *l* and line *m*.
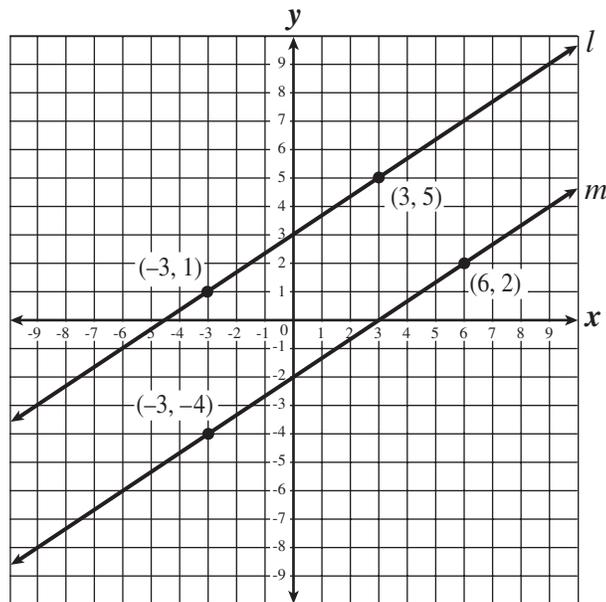
Which of the following is a true statement about the relationship between line *l* and line *m*?

A. The slope of line *l* is greater than the slope of line *m*.

B. The *x*-intercept of line *m* is greater than the *x*-intercept of line *l*.

C. The *y*-intercept of line *m* is greater than the *y*-intercept of line *l*.

D. The slope of line *m* is greater than the slope of line *l*.

5   The coordinate plane shown below has a figure in the third quadrant.
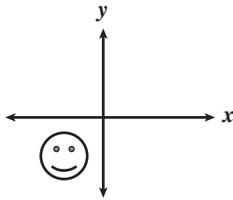
Which of the following shows the same figure after it has been reflected across the *y*-axis and then reflected across the *x*-axis?

A.

B.

C.

D.
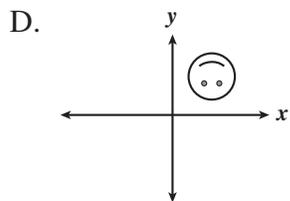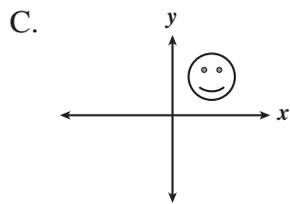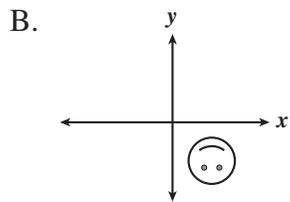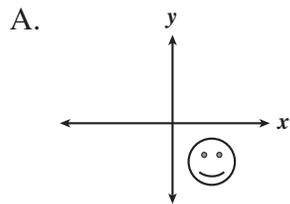
6   The first number in a pattern is 50. To go from one number in the pattern to the next number, the rule is to **divide by 5**. What is the fourth number in the pattern?

A. $\frac{1}{5}$

B. $\frac{2}{5}$

C. $\frac{3}{2}$

D. $\frac{5}{2}$

Questions 7 and 8 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

7   In the diagram below, $\triangle ABC$ and $\triangle DEF$ are similar triangles with the dimensions shown, in units.
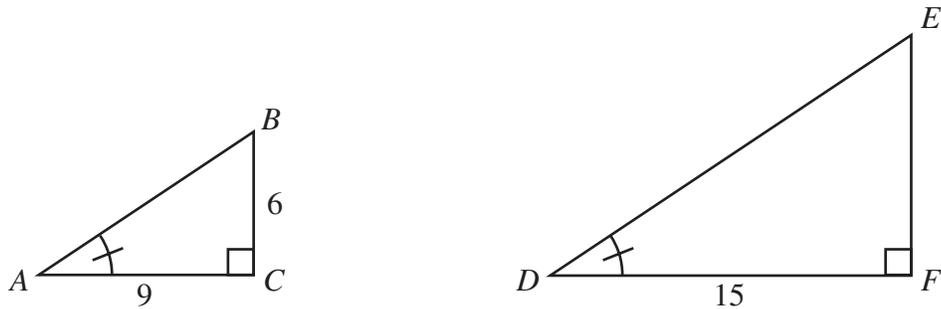
What is the length, in units, of $\overline{EF}$?

8   What is the solution to the equation shown below?

$$\frac{5}{6}x + 4 = 19$$

Question 9 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 9 in the space provided in your Student Answer Booklet.

9   Jian made some designs using equilateral triangles, as shown below. He noticed that as he added new triangles, there was a relationship between n, the number of triangles, and p, the outer perimeter of the design.
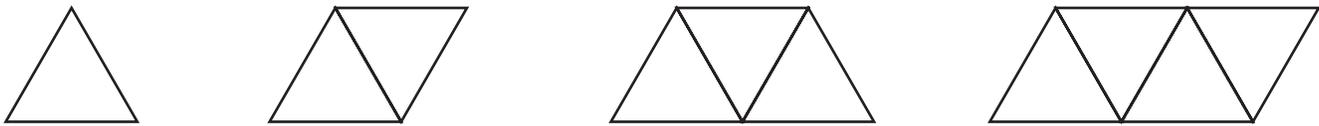
The table below lists the outer perimeters for the designs shown.

Number of Triangles	1	2	3	4	...	n
Outer Perimeter (in units)	3	4	5	6	...	p

a. If the pattern is continued, what would be the outer perimeter of a design using 10 triangles?

b. Write a rule for finding p, the outer perimeter for a design that uses n triangles.

c. On the grid in your Student Answer Booklet, draw a scatterplot on a coordinate plane that shows the relationship between the number of triangles and the outer perimeter of the design. Be sure to label the axes.

Mark your answers to multiple-choice questions 10 through 18 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

10 Which of the following is equivalent to the expression below?

$$\left(2^5\right)\left(2^6\right)$$

- A. 2^{11}
- B. 2^{30}
- C. 4^{11}
- D. 4^{30}

11 The scatterplot below shows the ages and heights of 11 players on the school football team. Each dot represents one player.

Ages and Heights of Players
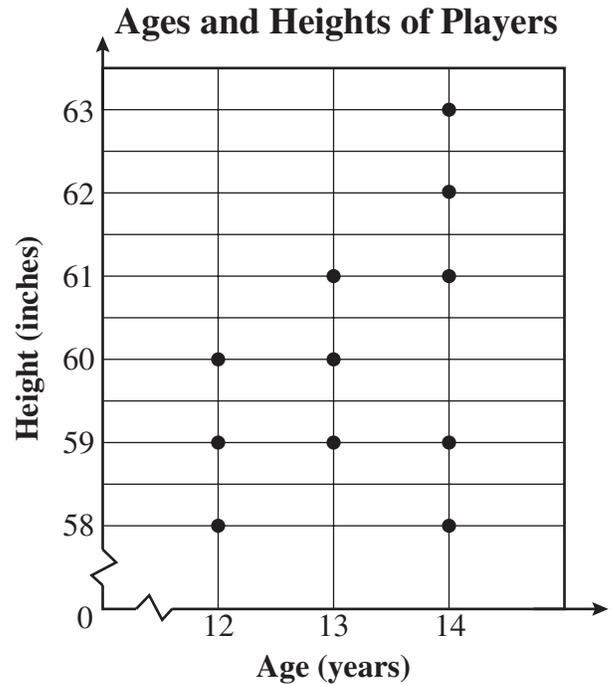
What is the total number of 14-year-olds who are **more than** 60 inches tall?

- A. 0
- B. 2
- C. 3
- D. 5

12   What is the solution to the equation below?

$$\frac{y}{-7} = 21$$

A. $y = -3$

B. $y = 3$

C. $y = 147$

D. $y = -147$

---

13   The results of four games played by a school's baseball team are shown in the table below.

Scores of the School Baseball Team's Four Games

Game	Home Team	Visiting Team
1	9	1
2	6	8
3	2	5
4	7	6

In which game was the positive difference in scores the **least** between the winning team and the losing team?

A. Game 1

B. Game 2

C. Game 3

D. Game 4

14 Which of the following is equivalent to multiplying any number, *n*, by 2?

A. dividing *n* by $\frac{1}{2}$

B. dividing *n* by 2

C. dividing *n* by $-\frac{1}{2}$

D. dividing *n* by -2

15 Which of the following is equivalent to the expression below?

$$-\tfrac{1}{2}(6 - 8x)$$

A. $-3 + 4x$

B. $3 + 4x$

C. $-3 - 8x$

D. $3 - 8x$

16 To win a game, Yepa must get a sum of 8 on her next two spins of the arrow on the spinner shown below. All the sections of the spinner are of equal size.
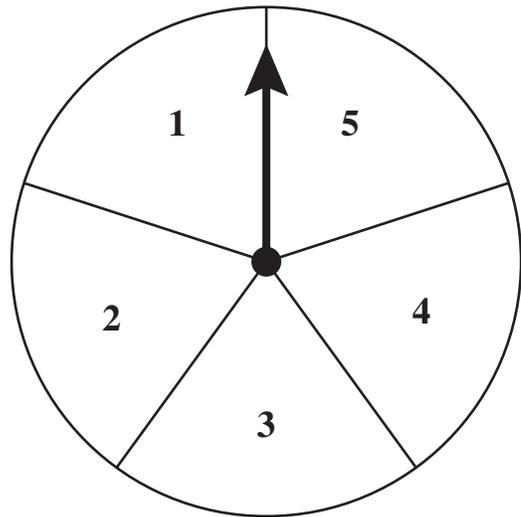
What is the probability that the results of Yepa's next two spins will have a sum of 8?

A. 0

B. $\frac{1}{25}$

C. $\frac{3}{25}$

D. $\frac{8}{25}$

17 The number 18 has a total of 6 factors: 1, 2, 3, 6, 9, and 18. What is the total number of factors that the number 130 has?

A. 4

B. 6

C. 8

D. 13

18 Coach Wilson constructed a Venn diagram that shows the number of eighth-grade athletes who play football, basketball, and hockey.
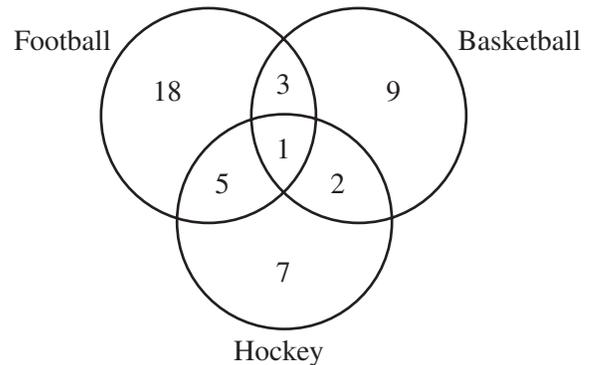
Which phrase best identifies the number 5 shown in the diagram?

A. the total number of athletes who do not play all three sports

B. the total number of athletes who play both football and hockey, but not basketball

C. the total number of athletes who play either football or hockey, but not both

D. the total number of athletes who do not play basketball

Questions 19 and 20 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

19   What is 30% of 600?

20   Chan is designing a new swimming pool that will have a length of 34 feet. He plans to make a scale drawing of the pool. In his drawing, $\frac{1}{4}$ inch represents 1 foot. What should be the length, in **inches**, of Chan's scale drawing of the pool?

Question 21 is a short-answer question. Write your answer to this question in the box provided in your Student Answer Booklet. Do not write your answer in this test booklet. You may do your figuring in the test booklet.

21 What is the value of the following expression?

$$\left|-5\right| + \left|-5\right| - \left|-3\right|$$

Question 22 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 22 in the space provided in your Student Answer Booklet.

22 The diagram below shows right triangle *ABC* drawn on a unit grid.

1 unit
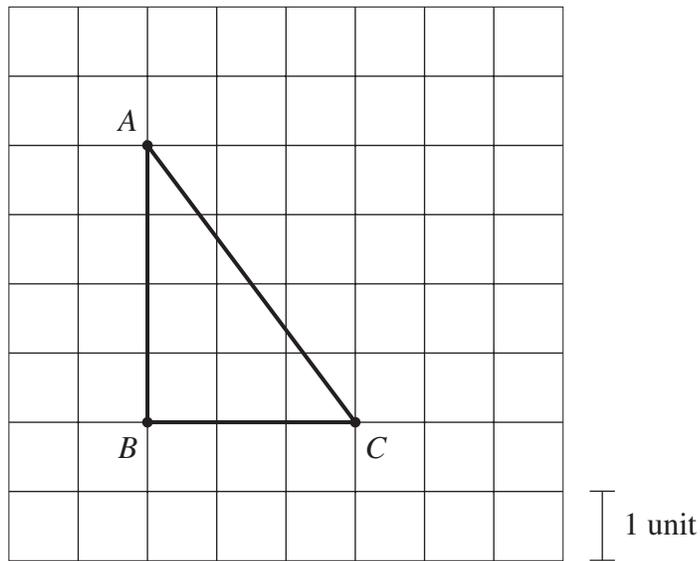
a. What is the length, in units, of line segment *AC*? Show or explain how you got your answer.

b. What is the area, in square units, of triangle *ABC*? Show or explain how you got your answer.

c. In your Student Answer Booklet, draw a rectangle that has the same area in square units as triangle *ABC*. Be sure to label the dimensions of your rectangle.

Mathematics

SESSION 2

You may use your reference sheet and MCAS ruler during this session.
You may use a calculator during this session.

DIRECTIONS
This session contains fourteen multiple-choice questions and three open-response questions.
Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

23 The graph below shows a family's annual expenses.

Family Annual Expenses
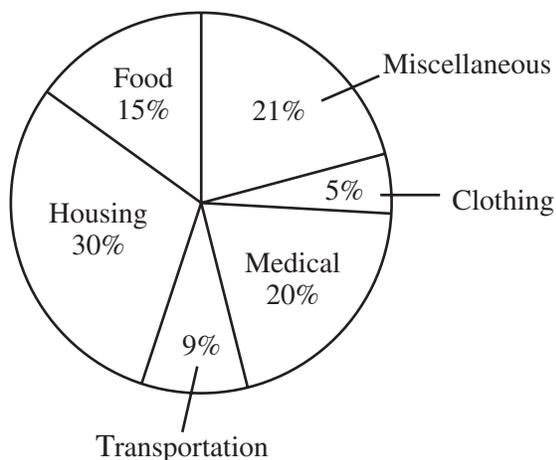
If the family's annual income is $40,000, what is the family's annual expense for housing?

A. $120

B. $3,000

C. $12,000

D. $30,000

24 In a recent year, there were 1682 students enrolled in Amherst College in Amherst, Massachusetts. The ratio of the number of students to the number of faculty members was approximately 15:2.

Based on this ratio, which of the following is closest to the number of faculty members that year?

A. 310

B. 220

C. 120

D. 110

25 Kristen was x inches tall a year ago. Since then, she has grown taller and is now y inches tall. Which of the following represents the number of inches Kristen grew during the past year?

A. $x + y$

B. $x - y$

C. $y - x$

D. $y \div x$

26 Three friends played a video game. Naomi won the greatest number of points. The chart below shows the results of the game.

Results of Video Game

Player	Number of Points
Naomi	4,500
Darla	2,000
Isaac	3,500

What fraction of the total number of points were won by Naomi?

A. $\frac{4}{5}$

B. $\frac{9}{20}$

C. $\frac{9}{11}$

D. $\frac{11}{20}$

27 Which of the following numbers is a solution for the inequality shown below?

$$7(2x - 3) > 49$$

A. 10

B. 5

C. 0

D. -6

Questions 28 and 29 are open-response questions.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 28 in the space provided in your Student Answer Booklet.

Use your MCAS ruler to answer question 28.

28 The scale map below shows a campground in a state park.

Campground

Park
Entrance

Antler
Bluff

| **Scale** |
| 1 inch $:$ $\frac{1}{2}$ mile |
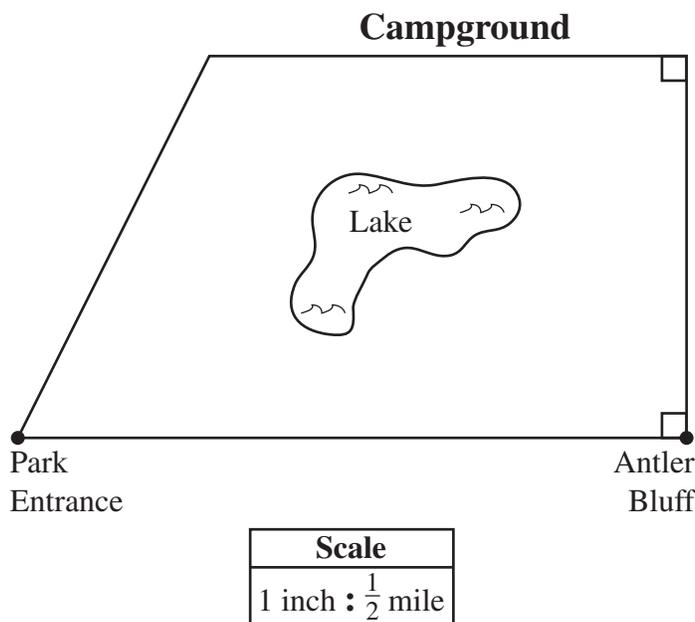
a. Based on the scale, what is the distance, in **miles**, from the park entrance to Antler Bluff? Show or explain how you got your answer.

b. What is the area, in **square miles**, of the campground? Show or explain how you got your answer.

Write your answer to question 29 in the space provided in your Student Answer Booklet.

29 Glenn bowls in a bowling league every Saturday morning. Last Saturday, the scores from Glenn's first 3 bowling games were 141, 128, and 157.

a. What is the mean of the scores from Glenn's first 3 games? Show or explain how you got your answer.

b. Glenn will bowl a fourth game. What will he have to bowl in his fourth game to have a mean of 150 for the 4 games? Show or explain how you got your answer.

c. Each player in Glenn's bowling league is given a handicap, which allows players of different abilities to compete equally. A player's handicap is determined with the following formula.

> *A player's handicap is equal to 80 percent of the difference between the player's average (mean) and 220.*

Miguel is Glenn's teammate. If Miguel's average (mean) is 130, what is his handicap? Show or explain how you got your answer.

Mark your answers to multiple-choice questions 30 through 38 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

30 The roads connecting the three towns on the map below form a right triangle. Two of the distances are given.

Maple   ?   Sable

25 km   20 km

Hickory
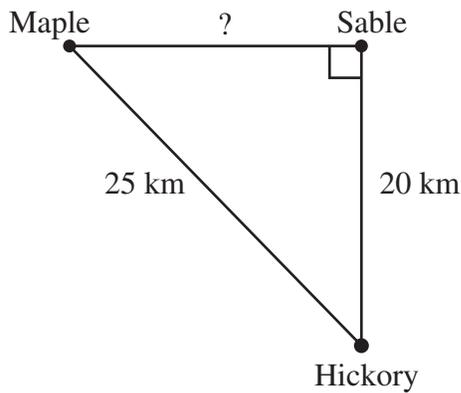
Based on the distances given on the map, what is the distance between Maple and Sable?

A. 12 km

B. 15 km

C. 16 km

D. 19 km

31 The line plot below shows the number of people in each student's household for a class of students.

```
         X
         X
 X  X        X
 X  X        X  X
 X  X  X  X  X
 X  X  X  X  X        X
 +--+--+--+--+--+--+-->
 2  3  4  5  6  7  8
```
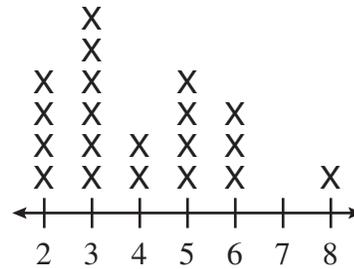
Number of People in Student Households

What is the mean number of people in households for this class of students?

A. 3

B. 3.5

C. 4

D. 6

32 Which of the following is **not** an irrational number?

A. π

B. $\sqrt{3}$

C. $\sqrt{8}$

D. $2\sqrt{4}$

196

33 The Madhany family traveled 3560 miles on a trip across the United States. Since one mile is about 1.6 kilometers, which of the following is closest to the total number of kilometers in 3560 miles?

A. 5700 kilometers

B. 4540 kilometers

C. 3558 kilometers

D. 2225 kilometers

34 Sari deposited $150.00 in a savings account that earns interest at a rate of 6% compounded annually. The table below shows her account balance at the end of each of three years.

**End-of-Year
Account Balances**

Year	Balance
1	$159.00
2	$168.54
3	$178.65

If Sari makes no additional deposits or withdrawals, which of the following will be closest to her account balance at the end of year 6?

A. $184.65

B. $189.37

C. $200.73

D. $212.77

35 On Monday, Chris and Ravi went to the gym. Chris plans to return every second day. Ravi plans to return every fourth day. If they follow their plans, what is the **next** day of the week they will both be at the gym on the same day?

A. Wednesday

B. Thursday

C. Friday

D. Saturday

36 The chart below shows the cost of the four different-sized boxes of chicken nuggets that are available at The Chicken Shack.

**Box Sizes and Costs
of Chicken Nuggets**

Box Size	Number of Nuggets in Box	Cost of Box (dollars)
Kid	5	1.29
Small	9	2.09
Medium	15	3.19
Large	22	4.99

Which of the following box sizes has the **least** cost per nugget?

A. Kid

B. Small

C. Medium

D. Large

37 Which of the following is equivalent to 20 centimeters?

A. 2000 millimeters

B. 200 millimeters

C. 20 millimeters

D. 2 millimeters

38 Which of the lines graphed below has the greatest positive slope?

A.

B.

C.

D.

198
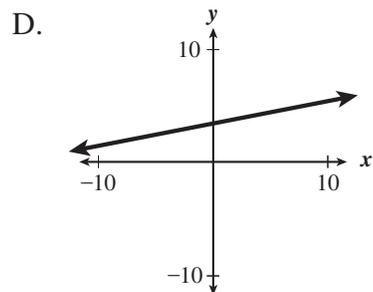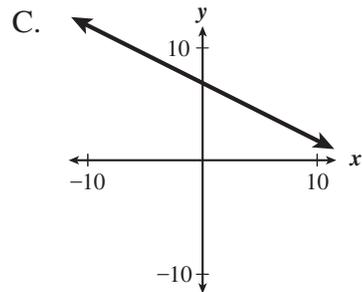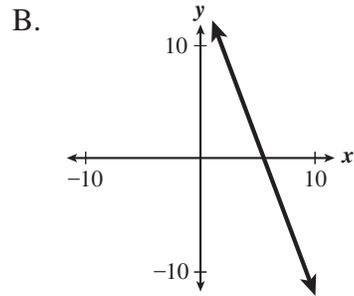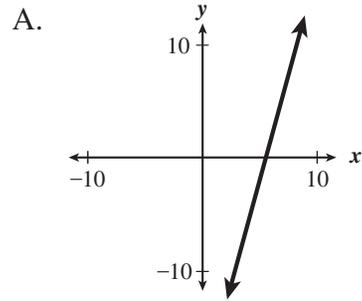
Question 39 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 39 in the space provided in your Student Answer Booklet.

39 Andrea works as a cashier in a music store. A customer wants to pay for a CD that is on sale for 15% off the regular price of $14.00.

~~$14.00~~
15% off

*Greatest
Rock 'N' Roll
Hits*
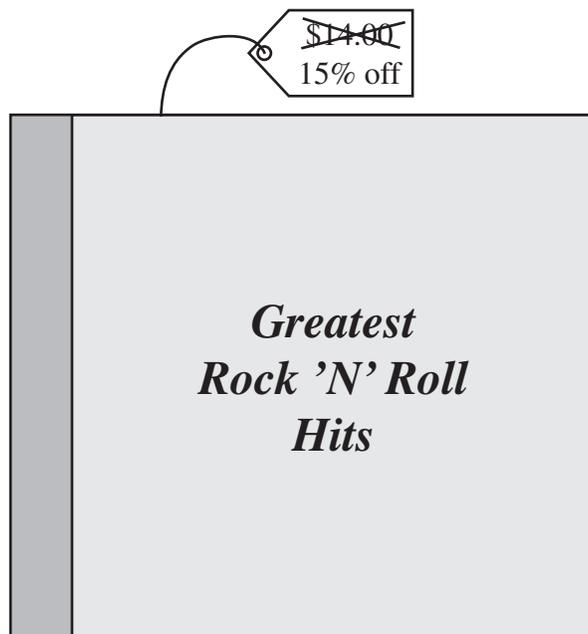
The cash register is broken, and Andrea must calculate the price of the CD using only a calculator.

a. What is the sale price of the CD? Show or explain how you got your answer.

b. Andrea needs to add 7% sales tax to the sale price of the CD. What should Andrea charge the customer for the CD, including tax? Show or explain how you got your answer.

c. The customer told Andrea that she could save time by just taking 8% off the regular price of the CD, because $15\% - 7\%$ is 8%. Is the customer right? Explain your reasoning.

PERIMETER FORMULAS

square..............$P = 4s$

rectangle ....$P = 2b + 2h$

triangle............$P = a + b + c$

CIRCLE FORMULAS

circle ....$C = 2\pi r$

OR

$C = \pi d$

$A = \pi r^2$

PYTHAGOREAN THEOREM
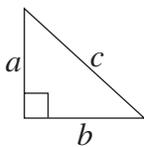
$a^2 + b^2 = c^2$

CONVERSIONS

1 mile $=$ 5280 feet

1 square mile $=$ 640 acres

AREA FORMULAS

square..............$A = s^2$

rectangle..........$A = bh$

OR

$A = lw$

triangle............$A = \frac{1}{2}bh$

circle ....$A = \pi r^2$

trapezoid ....$A = \frac{1}{2}h(b_1 + b_2)$

VOLUME FORMULAS

rectangular prism ....$V = Bh$
($B =$ area of base)

cone..............................$V = \frac{1}{3}\pi r^2 h$

cylinder ....$V = \pi r^2 h$

cube..............................$V = s^3$
($s =$ length of an edge)

Grade 8 Mathematics
Spring 2005 Released Items:
Reporting Categories, Standards, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC/SA)*
1	180	*Patterns, Relations, and Algebra*	8.P.6	A
2	180	*Patterns, Relations, and Algebra*	8.P.2	A
3	180	*Data Analysis, Statistics, and Probability*	8.D.3	D
4	181	*Patterns, Relations, and Algebra*	8.P.10	B
5	182	*Geometry*	8.G.6	D
6	182	*Patterns, Relations, and Algebra*	8.P.1	B
7	183	*Measurement*	8.M.4	10
8	183	*Patterns, Relations, and Algebra*	8.P.7	18
9	184	*Patterns, Relations, and Algebra*	8.P.1	
10	185	*Number Sense and Operations*	8.N.7	A
11	185	*Data Analysis, Statistics, and Probability*	8.D.2	C
12	186	*Patterns, Relations, and Algebra*	8.P.7	D
13	186	*Data Analysis, Statistics, and Probability*	8.D.2	D
14	187	*Number Sense and Operations*	8.N.9	A
15	187	*Patterns, Relations, and Algebra*	8.P.3	A
16	187	*Data Analysis, Statistics, and Probability*	8.D.4	C
17	188	*Number Sense and Operations*	8.N.5	C
18	188	*Data Analysis, Statistics, and Probability*	8.D.2	B
19	189	*Number Sense and Operations*	8.N.10	180
20	189	*Measurement*	8.M.1	$8\frac{1}{2}$ inches
21	190	*Number Sense and Operations*	8.N.6	7
22	191	*Geometry*	8.G.4	
23	192	*Number Sense and Operations*	8.N.10	C
24	192	*Number Sense and Operations*	8.N.3	B
25	192	*Patterns, Relations, and Algebra*	8.P.4	C
26	193	*Number Sense and Operations*	8.N.1	B
27	193	*Patterns, Relations, and Algebra*	8.P.7	A
28	194	*Measurement*	8.M.3	
29	195	*Data Analysis, Statistics, and Probability*	8.D.3	
30	196	*Geometry*	8.G.4	B
31	196	*Data Analysis, Statistics, and Probability*	8.D.3	C
32	196	*Number Sense and Operations*	8.N.2	D
33	197	*Measurement*	8.M.2	A
34	197	*Patterns, Relations, and Algebra*	8.P.1	D
35	197	*Number Sense and Operations*	8.N.5	C
36	198	*Number Sense and Operations*	8.N.3	C
37	198	*Measurement*	8.M.1	B
38	198	*Patterns, Relations, and Algebra*	8.P.5	A
39	199	*Number Sense and Operations*	8.N.10	

* Answers are provided here for multiple-choice and short-answer items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.

IX. Mathematics, Grade 10

Grade 10 Mathematics Test

The spring 2005 Grade 10 MCAS Mathematics Test was based on learning standards in the Massachusetts *Mathematics Curriculum Framework* (2000). The *Framework* identifies five major content strands listed below.

- Number Sense and Operations

- Patterns, Relations, and Algebra

- Geometry

- Measurement

- Data Analysis, Statistics, and Probability

The grade 9–10 learning standards for each of these strands appear on pages 72–75 of the *Mathematics Curriculum Framework*, which is available on the Department Web site at www.doe.mass.edu/frameworks/math/2000/final.pdf.

In *Test Item Analysis Reports* and on the *Subject Area Subscore* pages of the MCAS *School Reports* and *District Reports*, Mathematics test results are reported under five MCAS reporting categories, which are identical to the five *Framework* content strands listed above.

Test Sessions and Content Overview

The MCAS Grade 10 Mathematics Test included two separate test sessions, which were administered on consecutive days. Each session included multiple-choice and open-response questions. Session 1 also included short-answer questions.

Reference Materials and Tools

Each student taking the Grade 10 Mathematics Test was provided with a *Grade 10 Mathematics Reference Sheet*. A copy of the reference sheet follows the final question in this chapter.

During session 2, each student had sole access to a calculator with at least four functions and a square root key. Calculator use was not allowed during session 1. No other reference tools or materials were allowed.

The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only, during both Mathematics test sessions.

Cross-Reference Information

The table at the conclusion of this chapter indicates each item's reporting category and the *Framework* learning standard it assesses. The correct answers for multiple-choice and short-answer questions are also displayed in the table.

Mathematics

SESSION 1

You may use your reference sheet during this session.
*You may **not** use a calculator during this session.*

DIRECTIONS
This session contains fourteen multiple-choice questions, four short-answer questions, and three open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

1 What is the value of the expression below?

$$(3^2 + 3)(3^2 - 3)$$

A. 27

B. 72

C. 81

D. 90

2 The graph below shows the thickness of the ice on a lake during the colder months.

Lake Ice Thickness
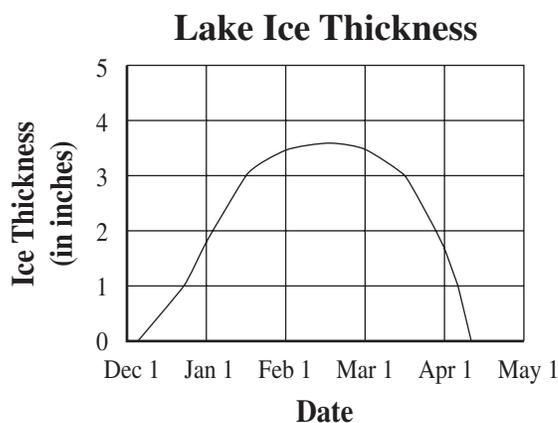
Which of the following is closest to the number of days the ice was at least 3 inches thick?

A. 30

B. 45

C. 60

D. 75

3 A fast-growing strain of bacteria doubles in population every 20 minutes. A laboratory has a culture of 200 of these bacteria cells. The function below can be used to find p, the number of bacteria cells in this culture after t **hours.**

$$p = 200(8^t)$$

Which of the following is closest to the total number of bacteria cells after 2 hours?

A. 3,200

B. 12,800

C. 51,200

D. 2,560,000

4 What is the value of the expression below?

$$\left|2^3 - 3^2\right|$$

A. 0

B. 1

C. 2

D. 3

5 Which of the following is a factor of the polynomial below?

$$4x^3y - 8x^2y^2 + 10xy^3$$

A. $4y^2$

B. $2x^2$

C. $2xy$

D. x^2y^2

6 The Golden Ratio is defined by the expression shown below.

$$\frac{1 + \sqrt{5}}{2}$$

Which of the following is closest to the value of the ratio?

A. 1.1

B. 1.6

C. 2.1

D. 2.9

7 In which equation below is the solution equal to the multiplicative inverse of $\frac{2}{3}$?

A. $\frac{2}{3} \cdot r = 1$

B. $\frac{2}{3} \cdot r = \frac{2}{3}$

C. $\frac{2}{3} \cdot r = 0$

D. $\frac{2}{3} \cdot r = -1$

8 Which of the following is closest to $\dfrac{2^5 \cdot 5^3}{33}$?

A. 5

B. 12

C. 120

D. 1200

9 What is the area of the parallelogram represented below?

4 cm

8 cm
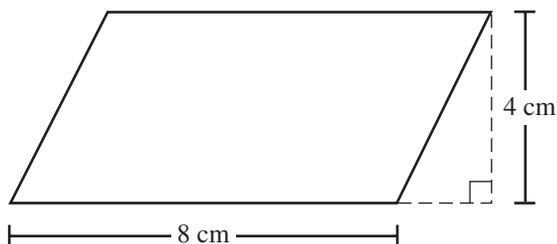
A. 32 cm²

B. 24 cm²

C. 16 cm²

D. 12 cm²

10 Which of the following best represents the equation of the line shown on the graph below?
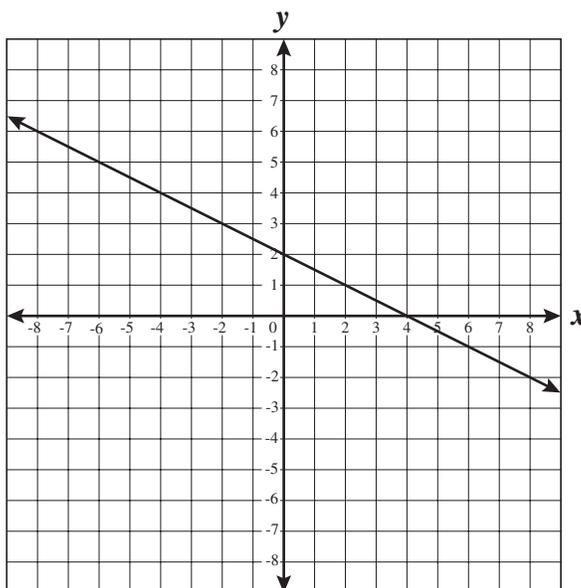
A. $y = -\frac{1}{2}x + 2$

B. $y = -2x + 2$

C. $y = -\frac{1}{2}x + 4$

D. $y = -2x + 4$

11 At a fish market, Mr. Estes bought several pounds of cod that was on sale for $3.59 per pound. The total cost of the cod that he bought was $28.63.

Which of the following is closest to the amount of cod that Mr. Estes bought?

A. 6 pounds

B. 7 pounds

C. 8 pounds

D. 9 pounds

12 Point X is graphed on the number line as shown below.

Which of the following numbers is closest to the location of point X?

A. $\sqrt{6}$

B. $\sqrt{8}$

C. $\sqrt{11}$

D. $\sqrt{13}$

13 If the denominator is not zero, which of the following is equivalent to the expression below?

$$\frac{6x^3 - 12x^2 - 9x}{3x}$$

A. $6x^3 - 12x^2 - 3$

B. $2x^2 - 12x^2 - 9x$

C. $6x^2 - 4x - 3$

D. $2x^2 - 4x - 3$

14 The graph below shows the number of milligrams of a medication in the bloodstream from the time it was administered to 300 minutes after administration.

Medication in the Bloodstream
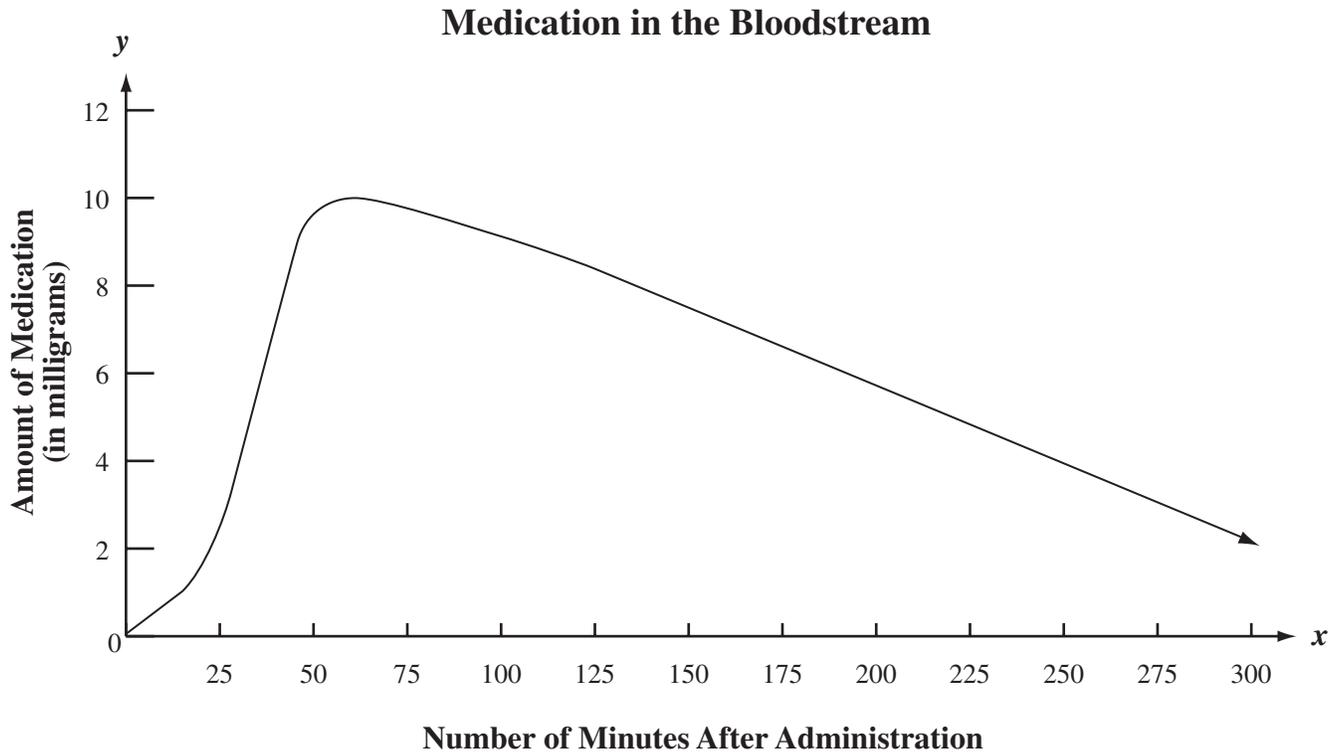
Using the information from the graph, which of the following statements is true?

A. The maximum amount of medication in the bloodstream was 12 milligrams.

B. The minimum amount of medication was in the bloodstream 300 minutes after administration.

C. The amount of medication in the bloodstream increased at a faster rate than it decreased.

D. The maximum amount of medication was in the bloodstream 100 minutes after administration.

Questions 15 and 16 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

15 Trapezoid *ABCD* shown below has bases measuring 6 inches and 10 inches and a height of *x* inches. Square *EFGH* shown below has sides measuring *x* inches. The trapezoid and the square have equal areas.
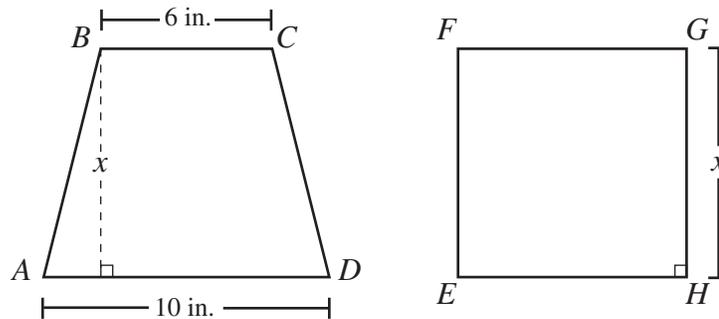
What is the value of *x*, in inches?

16 On an airline, approximately 10% of the airline passengers who are booked for a flight do not show up for the flight. The airline has booked 160 passengers for a flight with maximum seating of 135. How many of the 160 passengers booked for this flight will **not** have a seat, assuming 10% of the booked passengers do not show up?

Question 17 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 17 in the space provided in your Student Answer Booklet.

17 Quinn works in Chicago and in New York City. He travels by taxi in each of the two cities.

> In Chicago, he pays a fixed taxi fare of $1.90 per ride, plus $1.60 per mile traveled.

a. Write an equation that expresses f, Quinn's total fare for a taxi ride in Chicago, as a function of m, the number of miles traveled.

> In New York City, Quinn pays a fixed taxi fare of $1.50 per ride, plus 25¢ per $\frac{1}{10}$ mile traveled.

b. Write an equation that expresses f, Quinn's total fare for a taxi ride in New York City, as a function of m, the number of **miles** traveled.

c. On a recent trip Quinn noticed that the total number of miles traveled by taxi from the airport to the hotel was the same in each of the two cities. Before tips were added, his taxi fare to the hotel in New York City was $12.20 more than his taxi fare to the hotel in Chicago. What was the distance from the airport to the hotel in each city? Show or explain how you got your answer.

Questions 18 and 19 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

18 The circle graph shown below represents the membership of a service organization. In this organization, $\frac{2}{3}$ of the members are female.

**Service Organization
Membership**

Younger
than 18

Males

18 or
older

Younger
than 18

Females
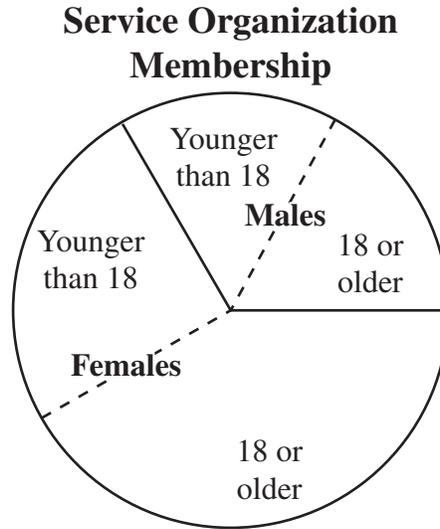
18 or
older

Approximately what fractional part of the total membership consists of males who are 18 or older?

19 In the figure shown below, $\overrightarrow{RS}$ is parallel to $\overrightarrow{TU}$, and $\overline{PT}$ intersects $\overrightarrow{RS}$ at Q.

P

?

25°

S

R

Q

105°

T

U
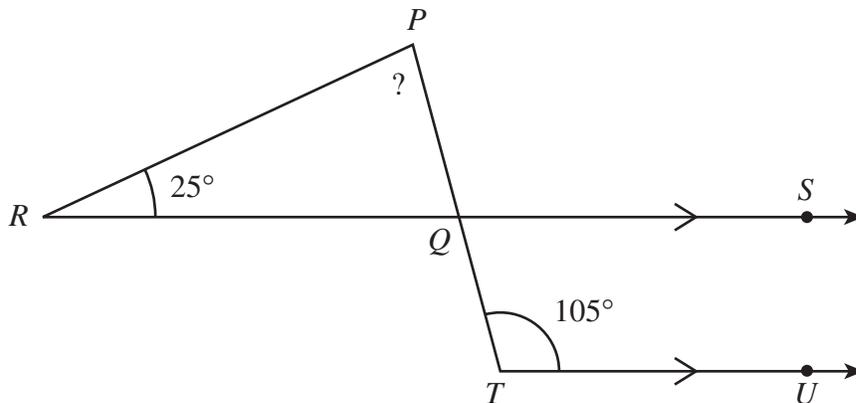
What is the measure of $\angle RPQ$?

Questions 20 and 21 are open-response questions.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 20 in the space provided in your Student Answer Booklet.

20   A landscaper's scale model of a patio is shown on the coordinate plane below. All of the corners of the patio form right angles, and the patio has both a horizontal and a vertical line of symmetry. The coordinates of some of the vertices are shown.
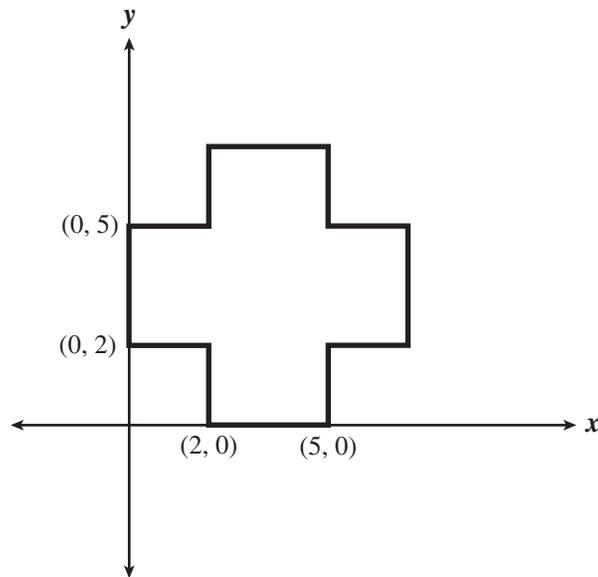
| **Scale** |
| 1 unit represents 1 yard |

a.   What is the total perimeter of the patio, in yards? Show or explain how you got your answer.

b.   What is the total area of the patio, in square yards? Show or explain how you got your answer.

c.   A circular fountain will be placed in the center of the patio at the point where the patio's lines of symmetry intersect. What are the coordinates of the point that shows where the center of the fountain will be placed? Show or explain how you got your answer.

Write your answer to question 21 in the space provided in your Student Answer Booklet.

21 Carla can use 100 square feet of floor space in her school's gymnasium, in any way she chooses, to set up computer stations for a science fair. She has chosen to use floor space in the shape of a rectangle, with dimensions that are **whole numbers**.

a. Draw all possible rectangles with an area of 100 square feet and whole-number dimensions. Your drawings do not have to be to scale, but you must label the dimensions on each drawing.

b. Carla plans to buy a length of rope to surround her floor space. Which rectangle that you drew in part a. has the smallest perimeter and will thus require the least amount of rope? Show or explain how you got your answer.

c. To set up her computer stations, Carla will subdivide her rectangular floor space into small rectangles that each measure 2 feet by 4 feet.

  • Using the rectangle you chose in part b. as Carla's floor space, what is the maximum number of these small rectangles that she can create?
  • To support your answer, sketch the rectangle from part b. subdivided into the maximum number of these small rectangles.
  • Explain how you know your answer is correct.

Mathematics

SESSION 2

You may use your reference sheet during this session.
You may use a calculator during this session.

DIRECTIONS

This session contains eighteen multiple-choice questions and three open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

22 Four major underwater tunnels were constructed in New York City between 1925 and 1950. The tunnels and their lengths are listed in the chart below.

New York City Tunnel Lengths

Tunnel Name	Length (kilometers)	Year Completed
Holland	2.6	1927
Lincoln	2.5	1937
Queens-Midtown	1.9	1940
Brooklyn-Battery	2.8	1950

Which of the following is closest to the mean of these four lengths?

A. 2.20 kilometers

B. 2.35 kilometers

C. 2.45 kilometers

D. 2.55 kilometers

23 A local university is divided into three colleges. The table below shows the number of students enrolled in each college.

University Enrollment

College	Number of Students
Arts and Sciences	8036
Business	2977
Law	1014

Which of the following circle graphs best represents the data in the table?

A.   **University Enrollment**
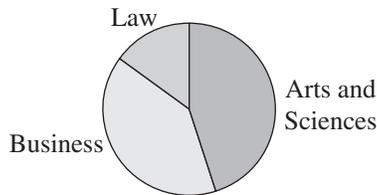
B.   **University Enrollment**
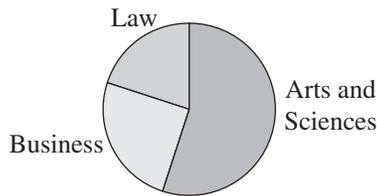
C.   **University Enrollment**
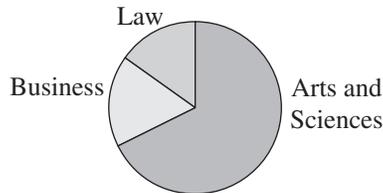
D.   **University Enrollment**
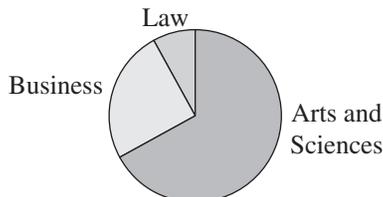
24 What is h, the height of the triangle represented below, if its area is 58.5 square centimeters?
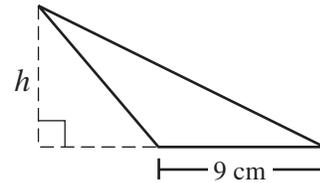
A. 13 cm

B. 18 cm

C. 26 cm

D. 39 cm

25 $\overline{AB}$ has one endpoint at $A(2, 5)$, and its midpoint is at $(4, 0)$. What are the coordinates of B, the other endpoint of $\overline{AB}$?

A. $(2, -5)$

B. $(3, 2.5)$

C. $(6, -5)$

D. $(6, 2.5)$

26 Of the people in attendance at a recent baseball game,

- one-third had grandstand tickets,

- one-fourth had bleacher tickets, and

- the remaining 11,250 people in attendance had other tickets.

What was the total number of people in attendance at the game?

A. 27,000

B. 20,000

C. 16,000

D. 18,000

27 Tiffany wants to calculate the volume of her globe. The globe is in the shape of a sphere, as represented by the picture below. She measured the circumference of the globe along the equator to be 24 inches.
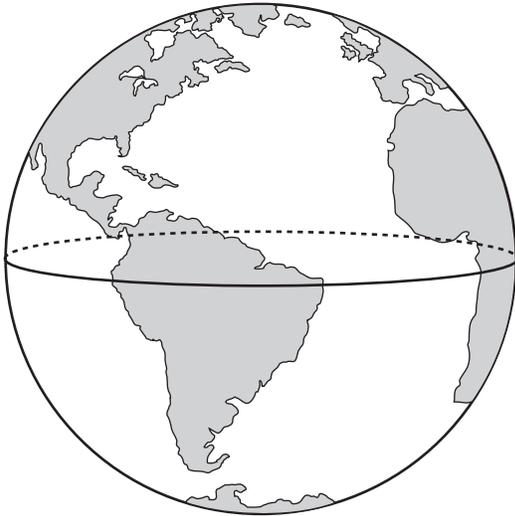
Which of the following measures is closest to the volume of Tiffany's globe?

A. 46 cubic inches

B. 61 cubic inches

C. 183 cubic inches

D. 234 cubic inches

28 Marcella's homeroom had a party at a local arcade. Each of the 26 students attending played the same game. Marcella recorded the number of points that each student scored for that game and put the data into score intervals. The results are shown in the chart below.

Arcade Game Scores

Score Interval (in points)	Number of Students
0 through 100	4
101 through 200	6
201 through 300	4
301 through 400	7
401 through 500	3
501 through 600	2

Based on the information in the chart, which interval contains the median score?

A. 101 through 200

B. 201 through 300

C. 301 through 400

D. 401 through 500

29 The diagram below shows the side view of a house. The base of its roof is 4 meters above ground level.
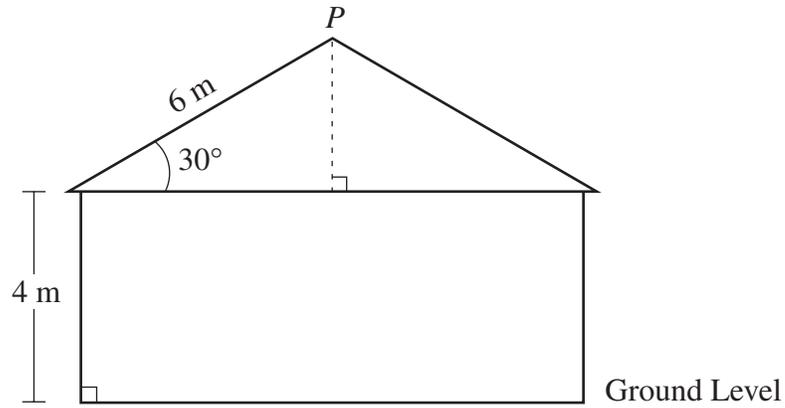
Point *P* is the highest point on the roof. Based on the diagram, what is the distance from *P* to ground level?

A. 6 m

B. 7 m

C. 10 m

D. 13 m

30 The stem-and-leaf plot below shows the scores on a history exam.

Exam Scores

5	8
6	2 7
7	0 3 3 6
8	4 5 5
9	2 2 2 4 7
10	0

Key
6│2 represents 62

Which of the following measures of the data is greatest?

A. mean

B. median

C. mode

D. range

Question 31 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 31 in the space provided in your Student Answer Booklet.

31 A designer at Royal Jewelers wants to create a 10-ounce necklace that will be made of gold and silver. The necklace will have a total value of $206.50.

a. Write an equation that represents the total weight of the 10-ounce necklace if it contains g ounces of gold and s ounces of silver.

b. Given that the value of gold is $318 per ounce and the value of silver is $5 per ounce, write an equation in terms of g and s that represents the total value of the 10-ounce necklace.

c. The two equations from parts a. and b. form a system. Solve the system of equations for g and s. Show all of your work.

d. What will be the value, in dollars, of the gold in the 10-ounce necklace? Show or explain how you got your answer.

Mark your answers to multiple-choice questions 32 through 40 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

32 A kite has perpendicular diagonals with the measures shown in the drawing below.

├─ 20 in. ─┼─ 20 in. ─┤

21 in.

99 in.
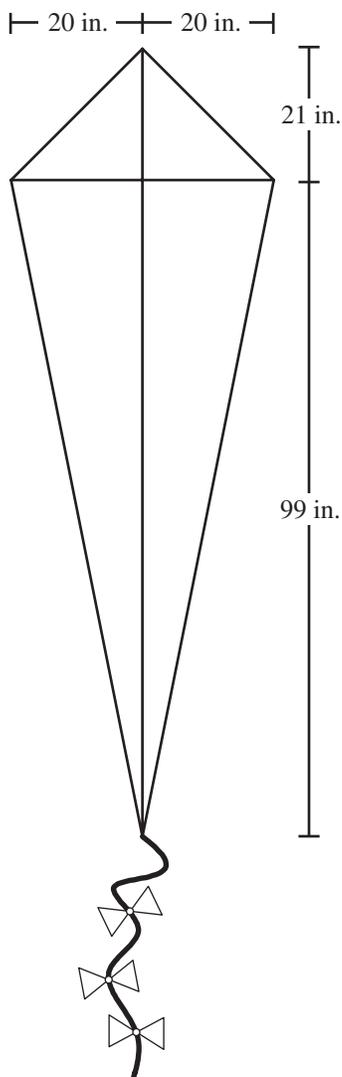
What is the perimeter, in inches, of the kite?

A. 130

B. 165

C. 260

D. 310

33 Deborah decided to mow lawns to earn the $280 she needs for a school orchestra trip. If she earns $18 per lawn, what is the **minimum** number of lawns she needs to mow to earn the money for the trip?

A. 15

B. 16

C. 18

D. 20

34 Which of the following is equivalent to the expression below?

$$(x - 2)(2x^2 + 3) + x^3 - 2x$$

A. $3x^3 - 2x - 6$

B. $3x^3 + x - 6$

C. $3x^3 - x^2 - 2x - 6$

D. $3x^3 - 4x^2 + x - 6$

35 The scatterplot below shows the ages and heights of 20 trees on a tree farm.

Tree Ages and Heights
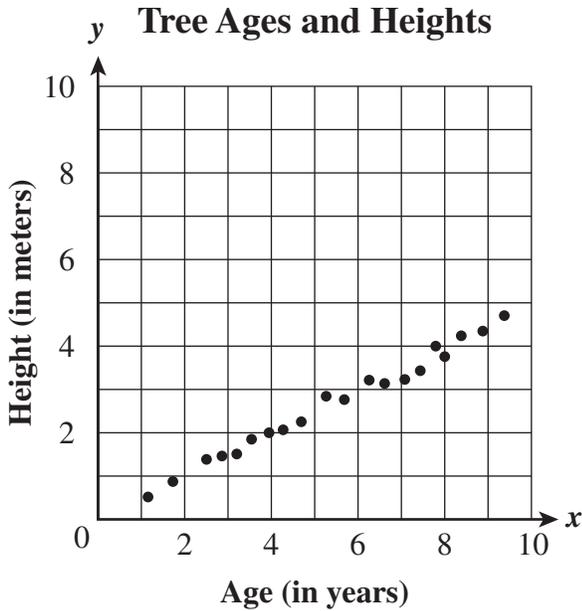
If x = age in years and y = height in meters, which of the following equations best approximates the line of best fit for this scatterplot?

A. $y = \frac{1}{2}x$

B. $y = \frac{1}{2}x + 5$

C. $y = 2x$

D. $y = 2x + 5$

36 The table below shows the test scores of 7 students. The scores are in order from least to greatest.

Test Scores

Student	Score
Janet	72
Mark	75
Luisa	77
Byron	81
Ray	84
Devin	86
Kamara	90

Which of the following would change the median of the scores?

A. adding 5 points to Janet's score

B. adding 5 points to Devin's score

C. subtracting 5 points from Ray's score

D. subtracting 5 points from Luisa's score

37 The chart below separates the number of students majoring in math/science from students pursuing other majors at a state college.

Students' Majors by Class

	Freshmen	Sophomores	Juniors	Seniors
Math/Science Majors	260	310	200	330
Other Majors	1390	1510	1450	1550

What percent of the math/science majors are seniors?

A. 43%

B. 30%

C. 21%

D. 5%

38 Each of the two interior supports for part of a roof is perpendicular to a rafter, as shown below.
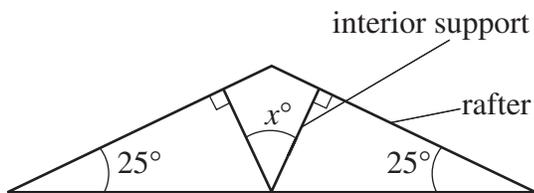
What is x, the measure, in degrees, of the angle formed by the two interior supports?

A. 50

B. 65

C. 90

D. 130

39 Kelly wants to buy a tool set that is on sale at a hardware store. The price of each tool set will be decreased by 8% each morning just before the store opens. The sale will last for 7 days, or until all the sets are sold.

After the first reduction on Monday, the price of each set was $135.

If Kelly wants to wait until the first day that the price is $100 or less, on which day should she buy her tool set, if one is still available?

A. Wednesday

B. Thursday

C. Friday

D. Saturday

40 How many square feet of carpeting are needed to cover the floor of the room represented by the drawing below? Note that the shaded region is to be left uncovered to leave space for the construction of a built-in trophy case with a rectangular base.
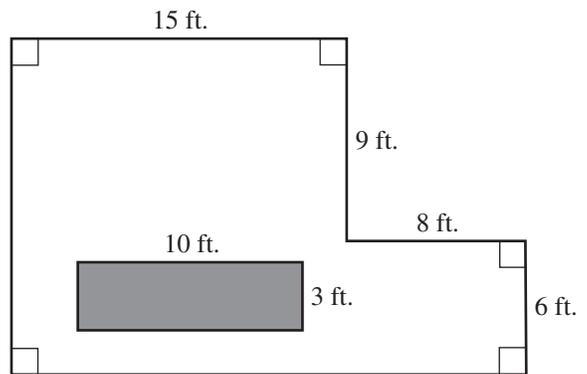
A. 125 sq. ft.

B. 243 sq. ft.

C. 273 sq. ft.

D. 303 sq. ft.

Questions 41 and 42 are open-response questions.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 41 in the space provided in your Student Answer Booklet.

41 In a report on the history of irrational numbers, Celine compared three different values that have been used to approximate π. The values are listed below.

$$\left(\frac{4}{3}\right)^4 \quad \text{Egyptian approximation}$$

$$\frac{355}{113} \quad \text{Chinese approximation}$$

$$\frac{22}{7} \quad \text{Archimedes' approximation (Greek)}$$

a. Celine compared $\left(\frac{4}{3}\right)^4$, the approximation used by the Egyptians, to $\frac{22}{7}$, a value that she

often uses for π. She converted both $\left(\frac{4}{3}\right)^4$ and $\frac{22}{7}$ to decimals rounded to four decimal places

(nearest ten-thousandth). To the nearest ten-thousandth, what is the absolute value of the

difference between $\left(\frac{4}{3}\right)^4$ and $\frac{22}{7}$? Show or explain how you got your answer.

b. Celine also compared $\frac{355}{113}$, the approximation used by the Chinese, to $\frac{22}{7}$. She converted $\frac{355}{113}$

to a decimal rounded to four decimal places (nearest ten-thousandth). To the nearest

ten-thousandth, what is the absolute value of the difference between $\frac{355}{113}$ and $\frac{22}{7}$? Show or

explain how you got your answer.

c. Celine knows that π ≈ 3.1415927. Place the four numbers, $\left(\frac{4}{3}\right)^4$, $\frac{355}{113}$, $\frac{22}{7}$, and π in order

from **least** to **greatest**. Explain your reasoning.

Write your answer to question 42 in the space provided in your Student Answer Booklet.

42   The double bar graph below shows the number of male and female participants in three different activities at a Field Day. Each person participated in just one activity.

Participants in Field Day Activities
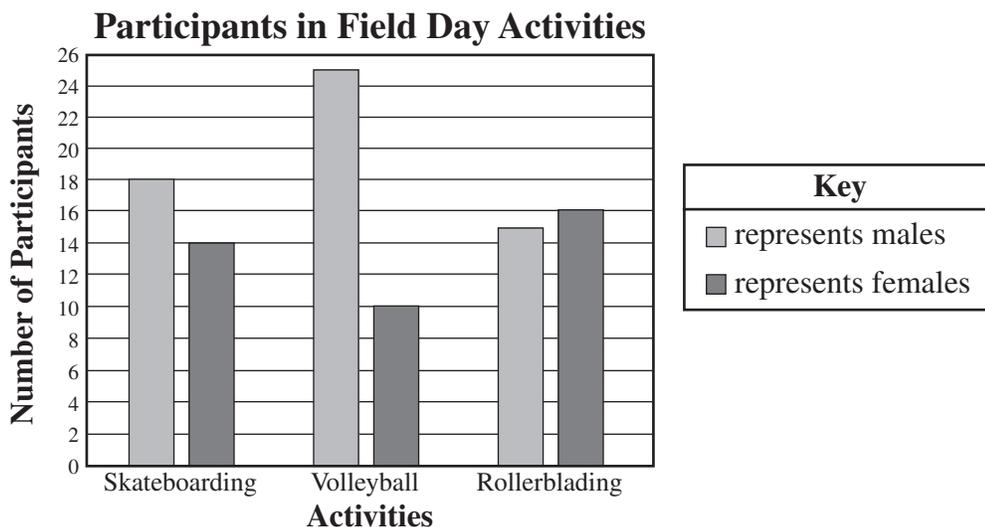
a. Based on the information in the graph, what was the ratio of male to female participants overall? Show or explain how you got your answer.

b. What percent of all of the female participants played volleyball? Show or explain how you got your answer.

c. Sketch and label a circle graph that shows the information given in the graph for the female participants. Your sketch does not have to be exact but should show the sectors relatively proportioned. Explain how you determined the size of each sector.

AREA FORMULAS

triangle ....$A = \frac{1}{2}bh$

rectangle ....$A = bh$

square ....$A = s^2$

trapezoid.........$A = \frac{1}{2}h(b_1 + b_2)$

CIRCLE FORMULAS

$C = 2\pi r$
$A = \pi r^2$

VOLUME FORMULAS

cube..$V = s^3$
($s = $ length of an edge)

rectangular prism ....$V = lwh$

OR

$V = Bh$
($B = $ area of the base)

sphere......................................$V = \frac{4}{3}\pi r^3$

right circular cylinder ....$V = \pi r^2 h$

right circular cone...................$V = \frac{1}{3}\pi r^2 h$

right square pyramid...............$V = \frac{1}{3}s^2 h$

LATERAL SURFACE AREA FORMULAS

rectangular prism ....$LA = 2(hw) + 2(lh)$
right circular cylinder ....$LA = 2\pi rh$
right circular cone..................$LA = \pi r \ell$
right square pyramid ....$LA = 2s\ell$
(ℓ = slant height)
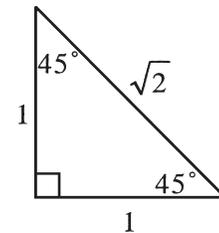
TOTAL SURFACE AREA FORMULAS

cube ....$SA = 6s^2$
rectangular prism...................$SA = 2(lw) + 2(hw) + 2(lh)$
sphere.....................................$SA = 4\pi r^2$
right circular cylinder ....$SA = 2\pi r^2 + 2\pi rh$
right circular cone..................$SA = \pi r^2 + \pi r \ell$
right square pyramid..............$SA = s^2 + 2s\ell$
(ℓ = slant height)

228
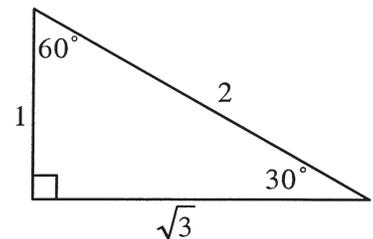
Grade 10 Mathematics
Spring 2005 Released Items:
Reporting Categories, Standards, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC/SA)*
1	204	*Number Sense and Operations*	10.N.2	B
2	204	*Data Analysis, Statistics, and Probability*	10.D.1	C
3	205	*Patterns, Relations, and Algebra*	10.P.7	B
4	205	*Number Sense and Operations*	10.N.2	B
5	205	*Patterns, Relations, and Algebra*	10.P.4	C
6	206	*Number Sense and Operations*	10.N.3	B
7	206	*Number Sense and Operations*	10.N.1	A
8	206	*Number Sense and Operations*	10.N.4	C
9	207	*Measurement*	10.M.1	A
10	207	*Patterns, Relations, and Algebra*	10.P.2	A
11	208	*Number Sense and Operations*	10.N.4	C
12	208	*Number Sense and Operations*	10.N.3	C
13	208	*Patterns, Relations, and Algebra*	10.P.3	D
14	209	*Data Analysis, Statistics, and Probability*	10.D.1	C
15	210	*Measurement*	10.M.1	8 inches
16	210	*Number Sense and Operations*	8.N.10	9
17	211	*Patterns, Relations, and Algebra*	10.P.7	
18	212	*Data Analysis, Statistics, and Probability*	10.D.1	any fraction, decimal, or percent approximately equal to $\frac{1}{6}$
19	212	*Geometry*	10.G.3	80°
20	213	*Geometry*	10.G.7	
21	214	*Measurement*	10.M.1	
22	215	*Data Analysis, Statistics, and Probability*	10.D.1	C
23	216	*Data Analysis, Statistics, and Probability*	10.D.1	D
24	216	*Measurement*	10.M.1	A
25	217	*Geometry*	10.G.7	C
26	217	*Patterns, Relations, and Algebra*	10.P.7	A
27	218	*Measurement*	10.M.2	D
28	218	*Data Analysis, Statistics, and Probability*	10.D.1	B
29	219	*Geometry*	10.G.6	B
30	220	*Data Analysis, Statistics, and Probability*	10.D.1	C
31	221	*Patterns, Relations, and Algebra*	10.P.8	
32	222	*Geometry*	10.G.5	C
33	222	*Patterns, Relations, and Algebra*	10.P.6	B
34	222	*Patterns, Relations, and Algebra*	10.P.3	D
35	223	*Data Analysis, Statistics, and Probability*	10.D.2	A
36	223	*Data Analysis, Statistics, and Probability*	10.D.1	C
37	224	*Data Analysis, Statistics, and Probability*	10.D.1	B
38	224	*Geometry*	10.G.5	A
39	225	*Patterns, Relations, and Algebra*	10.P.7	C
40	225	*Measurement*	10.M.1	B
41	226	*Number Sense and Operations*	10.N.2	
42	227	*Data Analysis, Statistics, and Probability*	10.D.1	

* Answers are provided here for multiple-choice and short-answer items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.

X. Science and Technology/Engineering, Grade 5

Grade 5 Science and Technology/Engineering Test

The spring 2005 Grade 5 MCAS Science and Technology/Engineering Test was based on learning standards in the Massachusetts *Science and Technology/Engineering Curriculum Framework* (2001). The *Framework* identifies four major content strands, listed below. Page numbers for the grade 3–5 learning standards appear in parentheses.

❚ Earth and Space Science (*Framework*, pages 22–26)

❚ Life Science (Biology) (*Framework*, pages 41–44)

❚ Physical Sciences (Chemistry and Physics) (*Framework*, pages 57–59)

❚ Technology/Engineering (*Framework*, pages 75–76)

The *Science and Technology/Engineering Curriculum Framework* is available on the Department Web site at www.doe.mass.edu/frameworks/scitech/2001/0501.pdf.

In *Test Item Analysis Reports* and on the *Subject Area Subscore* pages of the MCAS *School Reports* and *District Reports*, Science and Technology/Engineering test results are reported under four MCAS reporting categories, which are identical to the four *Curriculum Framework* content strands listed above.

Test Sessions and Content Overview

The MCAS Grade 5 Science and Technology/Engineering Test included two separate test sessions. Each session included multiple-choice and open-response questions.

Reference Materials and Tools

The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only, during both Science and Technology/Engineering test sessions. No other reference tools or materials were allowed.

Cross-Reference Information

The table at the conclusion of this chapter indicates each item's reporting category and the *Framework* learning standard it assesses. The correct answers for multiple-choice questions are also displayed in the table.

Science and Technology/Engineering

SESSION 1

DIRECTIONS
This session contains seventeen multiple-choice questions and two open-response questions.
Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

1 The picture below shows a group of toys on the floor.
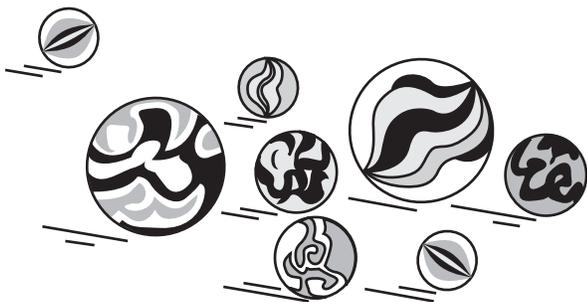
Which property of this set appears to be the same?

A. length

B. pattern

C. shape

D. volume

2 The table below shows the average monthly temperatures for Massachusetts over a 30-year period.

Month	Temperature
January	−1°C
February	0°C
March	3°C
April	?
May	15°C
June	20°C
July	23°C
August	22°C
September	18°C
October	13°C
November	7°C
December	1°C

The average temperature for April is missing. Which is the **best** estimate of the average temperature for April?

A. 1°C

B. 10°C

C. 16°C

D. 20°C

3 Which of the following activities is the **best** example of instinctive behavior in an animal?

A. A dog sits when told to sit by its owner.

B. A bird avoids an insect that has a bad taste.

C. A newly hatched sea turtle walks toward the ocean.

D. A chimpanzee uses a stick to pull termites from a tree stump.

4 The picture below shows a duck swimming in a lake.

A student sees a mirror image of a duck in the water of the lake. What causes this mirror image?

A. black light

B. refracted light

C. reflected light

D. absorbed light

5 The picture below shows a light bulb.
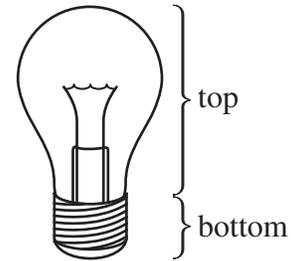
The bottom of this light bulb is an example of what type of simple machine?

A. a lever

B. a pulley

C. a screw

D. a wedge

6 David planted ten corn seeds in sandy soil and ten corn seeds in clay soil. He kept both groups of plants at room temperature, gave them the same amount of water, and placed them all in the same sunny room.

Which of the following questions is David most able to answer with his experiment?

A. How much soil and water do corn seeds need to grow?

B. Do corn plants grow better in sandy soil or in clay soil?

C. Do corn plants grown in sandy soil need more water than corn plants grown in clay soil?

D. What are the effects of soil, temperature, water, and sunshine on the growth of corn plants?

7 Which of the following animals goes through metamorphosis?

A. alligator

B. frog

C. lizard

D. turtle

8 Which of the following objects is probably the **most** flexible?

A. a ceramic dish

B. a wooden block

C. a short steel rod

D. a new rubber hose

9 Alicia has lots of old bicycle parts. She wants to build something new with the parts. What is the first thing Alicia should do?

A. plan the new item

B. construct the new item

C. try out the new item

D. evaluate the new item

10 When trees develop leaves in the spring, changes occur on the forest floor. Why does the development of leaves cause changes on the forest floor?

A. Rainfall increases.

B. Sunlight is reduced.

C. Wind speed increases.

D. Animal migration is stopped.

11 A student created the table of materials shown below.

Natural Materials	Human-made Materials
wood	plastic
cotton	polyester
clay	silk

Which of the materials in the table is listed incorrectly?

A. silk

B. clay

C. plastic

D. wood

12 The purpose of thorns on a plant is **most likely** to

A. help the plant to get moisture.

B. anchor the plant in the ground.

C. protect the plant from harm.

D. support the stems and branches.

13 The picture below shows a staircase.
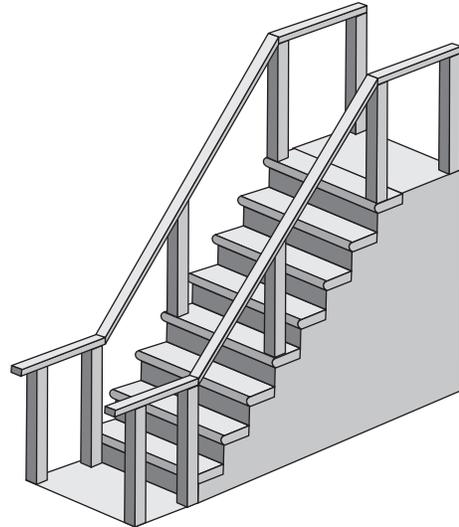
A staircase is **most** like what type of simple machine?

A. lever

B. wedge

C. inclined plane

D. wheel and axle

14 Which of the following properties **best** describes a material's ability to resist scratching?

A. weight

B. flexibility

C. length

D. hardness

15 When a volcano erupts, lava flows out from the top. What type of rock is formed as the lava cools?

A. magma

B. igneous

C. sedimentary

D. metamorphic

16 In a city, the daily high and low temperatures for a month are **best** represented by which of the following?

A. flow chart

B. line graph

C. pictograph

D. pie chart

17   The pictures below show animals separated into two different groups.
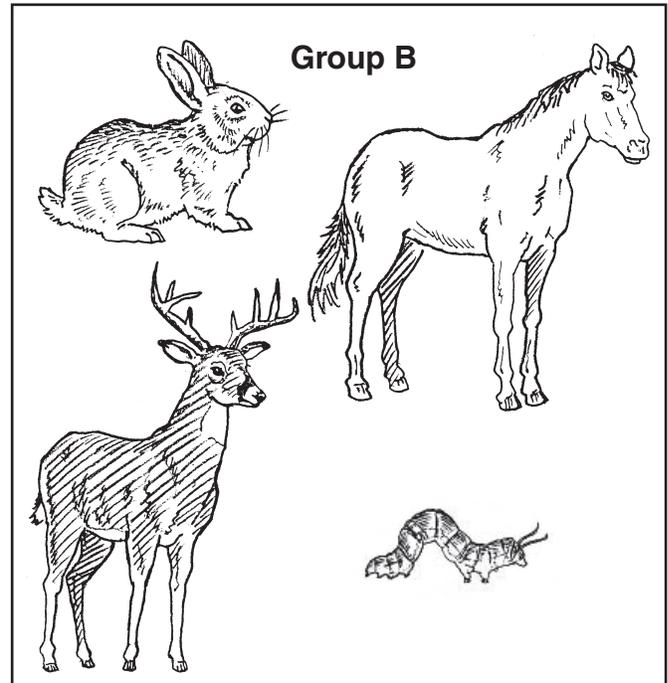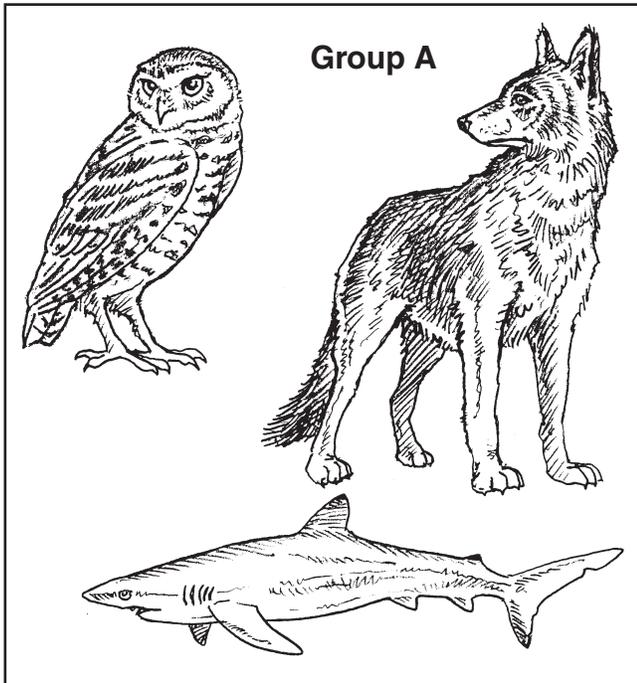
The animals above are grouped by eating habits. Which of the following animals belongs in Group A?

A. squirrel

B. sheep

C. hawk

D. goat

DIRECTIONS
Questions 18 and 19 are open-response questions.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 18 in the space provided in your Student Answer Booklet.

18 Starting from an egg, a butterfly goes through four stages in its life cycle.

a. In your Student Answer Booklet, draw the life cycle of a butterfly, showing the four stages in order.

b. Label **each** of the four stages.

c. Draw arrows to connect the stages in the correct order.

Write your answer to question 19 in the space provided in your Student Answer Booklet.

19 A cook notices a teakettle full of water on a stove. There is a cold window close to the spout of the kettle. The water begins to boil and water droplets begin to form on the window.

a. Describe in detail what is happening to the water inside the kettle.

b. Why do the water droplets form on the window? Be sure to explain in detail.

Science and Technology/Engineering

SESSION 2

DIRECTIONS
This session contains seventeen multiple-choice questions and three open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

20 Kendra has a mineral that she wants to identify. It is white in color, has a glassy luster, and has a hardness of 5. The table below shows some properties of selected minerals.

Mineral	Color(s)	Luster	Hardness
Calcite	White	Dull or Pearly	3
Fluorite	White, Blue, Green, Violet	Glassy	4
Apatite	White, Green, Brown, Violet	Glassy or Greasy	5
Topaz	Yellow, Red, White, Blue	Glassy	8

Based on the information in the table, Kendra's mineral is **most** similar to

A. calcite.

B. fluorite.

C. apatite.

D. topaz.

21 Female seals usually return to the same beaches year after year to give birth. If they are repeatedly disturbed by humans at those beaches, how will the seals **most likely** respond?

A. They will change color.

B. They will give birth to more pups.

C. They will hunt for food more often.

D. They will give birth at different beaches.

22 What happens to the path of a light ray as it passes from air into water at an angle?

A. Its path widens.

B. Its path bends.

C. Its path becomes shorter.

D. Its path continues in a straight line.

23 The weather balloon shown below is made to carry instruments for collecting data about the atmosphere.

Balloon

Cord
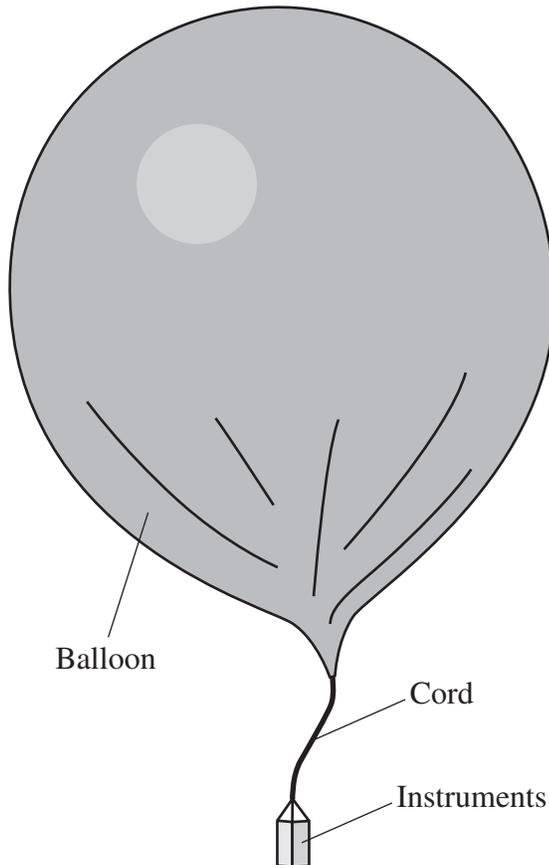
Instruments

What property of the instruments must be considered in order for the balloon to rise?

A. height

B. shape

C. strength

D. weight

24 Tomato plants grow in warm weather. If the temperature drops below 32°F for two days in a row, what will **most likely** happen to the tomato plants?

A. They will die.

B. They will migrate.

C. They will hibernate.

D. They will grow faster.

25 When the temperature of a sample of water is −5°C, the water is

A. a gas.

B. a liquid.

C. a solid.

D. a vapor.

26 In which case would it take the **most** effort to make points 1 and 2 on the magnets touch each other?

A.

| N | S | •1   2• | N | S |

B.

| S | N | •1   2• | S | N |

C.

N •1   2• N
S   S

D.

N •1   2• S
S   N
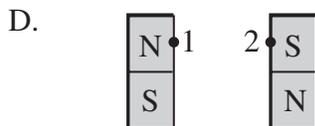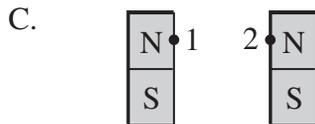
27 Clouds and fog are made up of

A. water.

B. heat.

C. light.

D. helium.

28 Which habitat on Earth would **probably** add the greatest amount of water to the water cycle through evaporation?

A. cold lake

B. desert sand

C. warm ocean

D. mountain rock

29 Which of the following was probably **most** important in the formation of dark, fertile soil that is good for farming?

A. plant decomposition

B. radioactive decay

C. water erosion

D. wind erosion

30 When a light bulb is turned on, energy changes from one form to another. Which of the following **best** describes this change?

A. sound energy to light energy

B. nuclear energy to light energy

C. electrical energy to light energy

D. magnetic energy to light energy

31   The picture below shows a flower with a long slender bloom.

The size and shape of a bird's beak are related to the type of food that the bird eats. Which of the following beaks is suitable for drinking nectar located deep within flowers such as the one shown above?

A.

B.

C.

D.
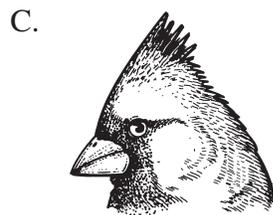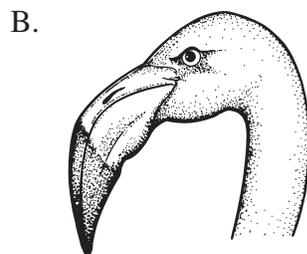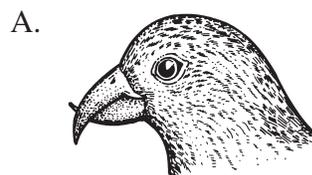
32　Which of the following climates has cold winters and hot summers?

A. polar

B. subtropical

C. temperate

D. tropical

33　Sound reaches our ears because sound makes air particles

A. heat up.

B. cool down.

C. slow down.

D. vibrate.

34　A small laundry room has several shelves above the washing machine. These shelves are an example of

A. making the wall stronger.

B. using storage space efficiently.

C. using a machine for more than one purpose.

D. solving the need for shelter in a creative way.

35 The picture below shows a compass.
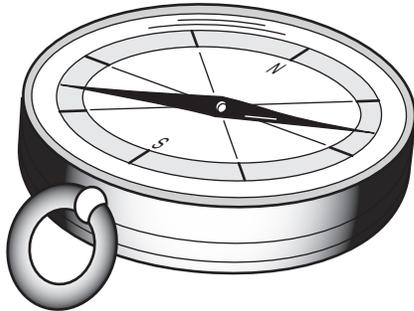
Which type of energy causes the needle on this compass to move?

A. heat

B. light

C. magnetic

D. sound

36 Which weather instrument measures air pressure?

A. thermometer

B. anemometer

C. rain gauge

D. barometer

DIRECTIONS
Questions 37 through 39 are open-response questions.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 37 in the space provided in your Student Answer Booklet.

37 How is soil formed? In your answer, include **two** of the major components of soil.

Write your answer to question 38 in the space provided in your Student Answer Booklet.

38 The picture below shows some camping supplies. These supplies were brought on a camping trip by a group of students.

plastic tarp
camping stove
fishing poles
axe
sleeping bags
shovel
pots and pans
cooler
flashlight
rope
fishing net
stream
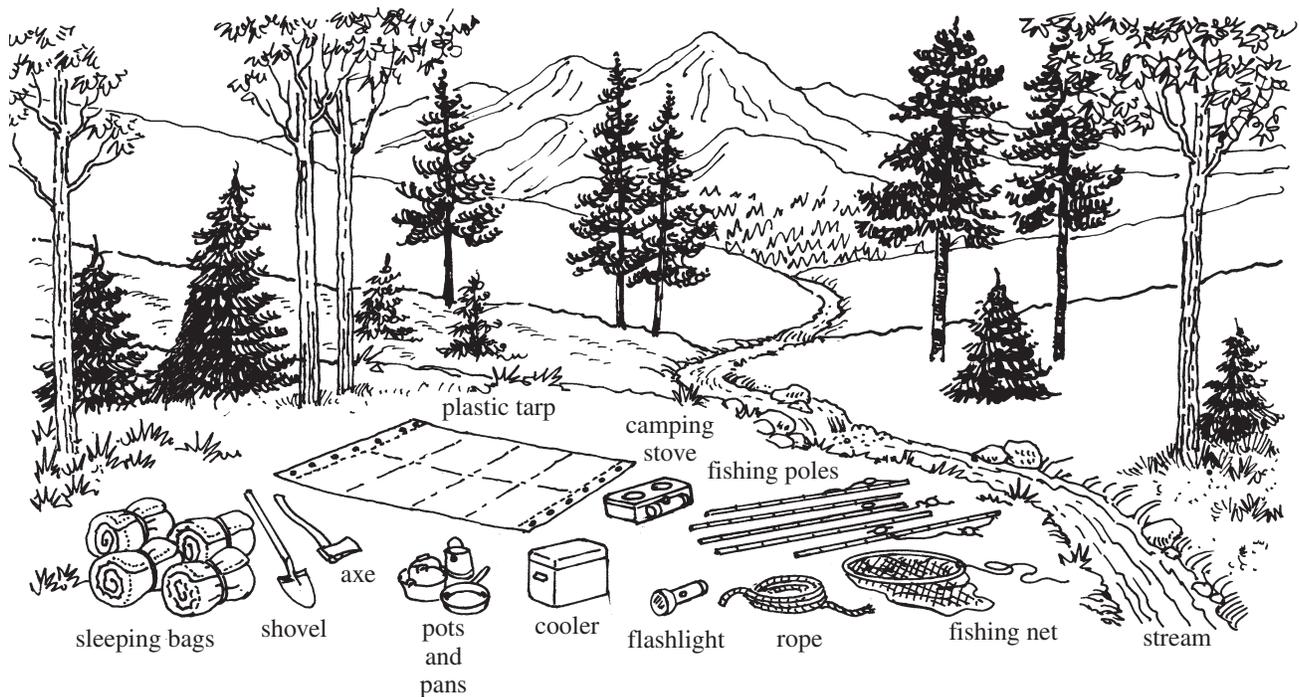
The students forgot their tent. The weather forecast predicted rain for that evening.

a. From the supplies pictured, list materials that the students can use to construct a shelter to keep dry.

b. Describe how the students would use these materials to create the shelter.

c. The students' shelter needs to be safe. Should the students build their shelter in the clearing near the stream or in the wooded area? Explain the reasons for your choice based on safety factors.

Write your answer to question 39 in the space provided in your Student Answer Booklet.

39 Penguins are birds that have webbed feet and very small wings. They are unable to fly, but can use their wings as paddles. They also have thick, oily feathers and a thick layer of fat. Most penguins are black and white in color.

a. List **two** features of penguins that help them survive.

b. Explain how these features help penguins survive in their natural environment.

Grade 5 Science and Technology/Engineering
Spring 2005 Released Items:
Reporting Categories, Standards, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC)*
1	232	*Physical Science (Chemistry and Physics)*	1	C
2	232	*Earth and Space Science*	6	B
3	233	*Life Science (Biology)*	8	C
4	233	*Physical Science (Chemistry and Physics)*	12	C
5	233	*Technology/Engineering*	1.3	C
6	233	*Earth and Space Science*	5	B
7	234	*Life Science (Biology)*	4	B
8	234	*Physical Science (Chemistry and Physics)*	1	D
9	234	*Technology/Engineering*	2.3	A
10	234	*Life Science (Biology)*	10	B
11	235	*Technology/Engineering*	2.4	A
12	235	*Life Science (Biology)*	2	C
13	235	*Technology/Engineering*	1.3	C
14	235	*Technology/Engineering*	1.1	D
15	236	*Earth and Space Science*	3	B
16	236	*Technology/Engineering*	2.2	B
17	237	*Life Science (Biology)*	1	C
18	238	*Life Science (Biology)*	4	
19	238	*Physical Science (Chemistry and Physics)*	3	
20	239	*Earth and Space Science*	2	C
21	239	*Life Science (Biology)*	7	D
22	239	*Physical Science (Chemistry and Physics)*	12	B
23	240	*Technology/Engineering*	2.3	D
24	240	*Life Science (Biology)*	7	A
25	240	*Physical Science (Chemistry and Physics)*	2	C
26	241	*Physical Science (Chemistry and Physics)*	9	C
27	241	*Earth and Space Science*	10	A
28	241	*Earth and Space Science*	11	C
29	242	*Earth and Space Science*	4	A
30	242	*Physical Science (Chemistry and Physics)*	5	C
31	243	*Life Science (Biology)*	6	D
32	244	*Earth and Space Science*	9	C
33	244	*Physical Science (Chemistry and Physics)*	11	D
34	244	*Technology/Engineering*	2.1	B
35	245	*Physical Science (Chemistry and Physics)*	4	C
36	245	*Earth and Space Science*	6	D
37	246	*Earth and Space Science*	4	
38	247	*Technology/Engineering*	2.1	
39	248	*Life Science (Biology)*	6	

* Answers are provided here for multiple-choice items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.

XI. Science and Technology/Engineering, Grade 8

Grade 8 Science and Technology/Engineering Test

The spring 2005 Grade 8 MCAS Science and Technology/Engineering Test was based on learning standards in the Massachusetts *Science and Technology/Engineering Curriculum Framework* (2001). The *Framework* identifies four major content strands listed below. Page numbers for the grade 6–8 learning standards appear in parentheses.

◼ Earth and Space Science (*Framework*, pages 29–30)

◼ Life Science (Biology) (*Framework*, pages 46–48)

◼ Physical Sciences (Chemistry and Physics) (*Framework*, pages 60–62)

◼ Technology/Engineering (*Framework*, pages 76–79)

The *Science and Technology/Engineering Curriculum Framework* is available on the Department Web site at www.doe.mass.edu/frameworks/scitech/2001/0501.pdf.

In *Test Item Analysis Reports* and on the *Subject Area Subscore* pages of the MCAS *School Reports* and *District Reports*, Science and Technology/Engineering test results are reported under four MCAS reporting categories, which are identical to the four *Curriculum Framework* content strands listed above.

Test Sessions and Content Overview

The MCAS Grade 8 Science and Technology/Engineering Test included two separate test sessions. Each session included multiple-choice and open-response questions.

Reference Materials and Tools

The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only, during both Science and Technology/Engineering test sessions. No other reference tools or materials were allowed.

Cross-Reference Information

The table at the conclusion of this chapter indicates each item's reporting category and the *Framework* learning standard it assesses. The correct answers for multiple-choice questions are also displayed in the table.

Science and Technology/Engineering

SESSION 1

DIRECTIONS
This session contains seventeen multiple-choice questions and two open-response questions.
Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

1 While hiking through Granville State Forest, a student finds an unusual plant-like organism that appears to lack chlorophyll. When the student examines a sample using a microscope, he sees many cells with cell walls and no chloroplasts.

This organism is **most likely** a member of what Kingdom?

A. Animalia

B. Eubacteria

C. Fungi

D. Protista

2 Which of the following statements **best** explains why the lower mantle of Earth is much more rigid and dense than the upper mantle?

A. The lower mantle is older than the upper mantle.

B. The lower mantle is cooler than the upper mantle.

C. The lower mantle is under more pressure than the upper mantle.

D. The lower mantle is farther from the core than the upper mantle.

3 The drawing below shows an entrance to a building with both steps and a ramp.
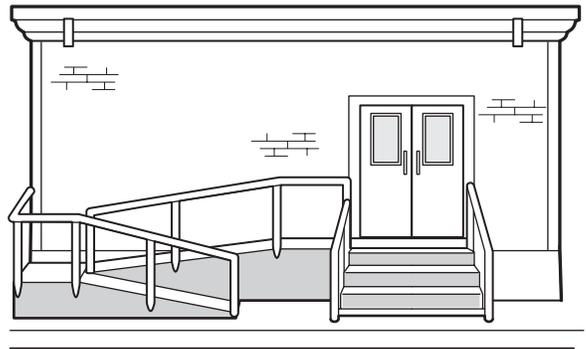
The ramp in front of this building **most likely** functions as which of the following?

A. an assistive device

B. a structural support

C. a prosthetic device

D. a suspension system

4 Which of the following is an example of a physical change?

A. lighting a match

B. breaking a glass

C. burning of gasoline

D. rusting of iron

5 Mercury, the planet nearest to the Sun, has extreme surface temperatures, ranging from 465°C in sunlight to –180°C in darkness.

Why is there such a large range of temperatures on Mercury?

A. The planet is too small to hold heat.

B. The planet is heated on only one side.

C. The planet reflects heat from its dark side.

D. The planet lacks an atmosphere to hold heat.

6 Fossilized coral reefs, fish, and other warm water marine creatures have been found in mountainous regions of New England. Which of the following **best** explains how this could have occurred?

A. The climate and geology of this area have changed over time.

B. These creatures were better adapted to cold climates at one time.

C. The process of fossilization greatly changed the original material.

D. Scavengers carried the remains of these creatures to higher regions.

7 When air near the ground is warmed by sunlight, which of the following occurs?

A. The warm air radiates and becomes cool again.

B. The warm air evaporates into the cooler air.

C. The warm air expands and rises, resulting in convection.

D. The warm air loses its ability to hold water and precipitates.

8 The diagram below represents part of the horse fossil record from three time periods. It includes illustrations of the hooves and teeth of horses from each time period.
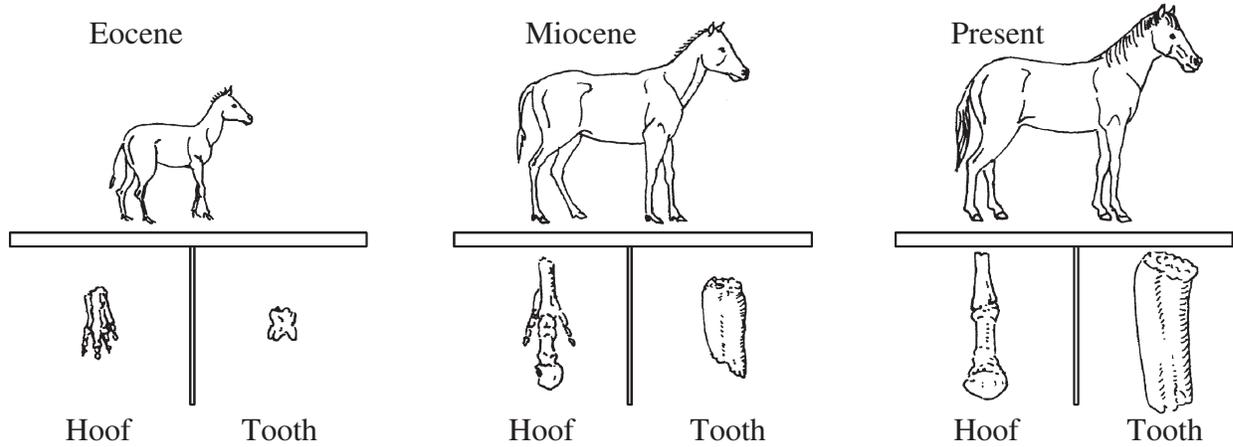
Which of the following statements is **best** supported by the horse fossil record?

A. The horse has been a carnivore.

B. The horse has changed over time.

C. The horse has many common ancestors.

D. The horse has lived in the same ecosystem.

9 The diagram below represents a diver's motion from the top of a high diving board into a pool of water.
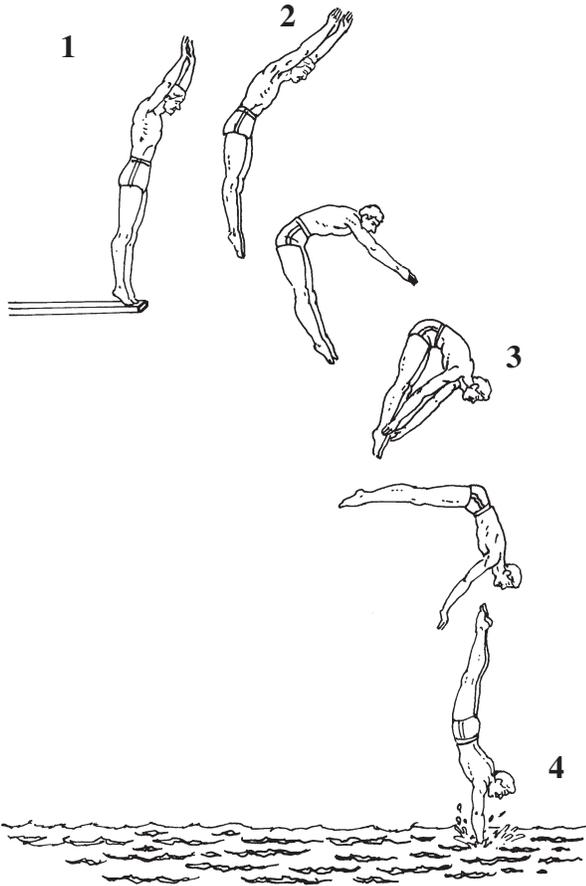
At which labeled point does the diver have the **least** potential energy?

A. 1

B. 2

C. 3

D. 4

10 The diagram below shows a polar projection of Earth and four positions of the Moon.
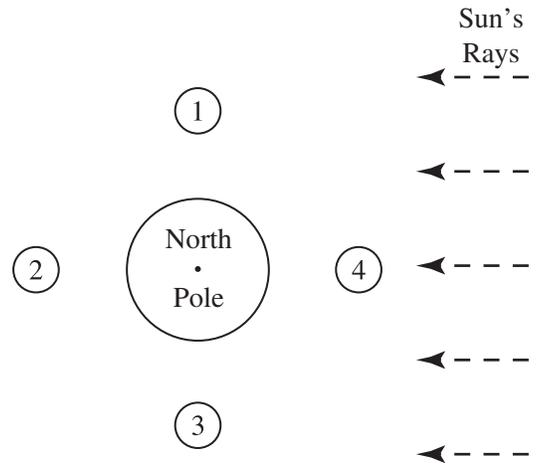
The highest high tides and lowest low tides are called spring tides. Which positions of the Moon produce spring tides in Earth's oceans?

A. 1 and 2

B. 2 and 4

C. 1 and 3

D. 3 and 4

11 The diagram below shows the path of a jet from Washington, D.C. to Dallas, TX.

The trip takes approximately 2 hours and covers approximately 1900 km. Which of the following **best** describes the speed and direction of the jet's flight?

A. 475 km/h southwest

B. 950 km/h southwest

C. 1900 km/h southwest

D. 3800 km/h southwest

12 Which of the following describes a feature that is shared by Earth and the Moon?

A. They have nearly the same atmosphere.

B. They have almost the same gravitational pull.

C. They have a rocky crust that includes mountains.

D. They have areas that show considerable water erosion.

13 A beam bridge supporting a toy truck is shown in the diagram below.
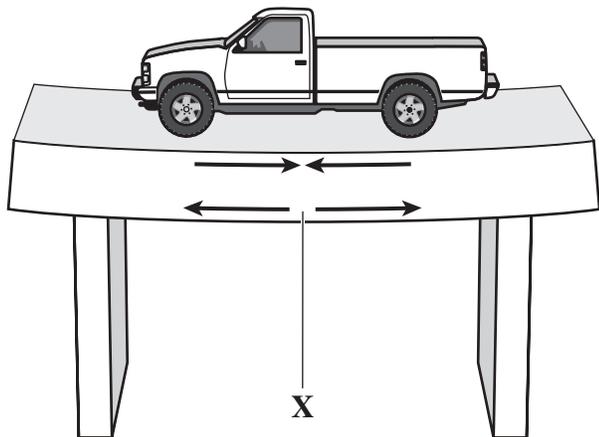
When an object pushes down on this bridge, the bottom edge experiences a force that tends to pull it apart as shown. What is the type of force labeled X?

A. compression

B. shear

C. tension

D. torsion

14 If 1 kg of the compound toluene melts at −95°C, then 500 g of toluene will

A. melt at −47.5°C.

B. melt at −95°C.

C. boil at 95°C.

D. boil at 47.5°C.

15 Sulfur (S), oxygen (O_2), water (H_2O), and sodium chloride (NaCl) are all examples of pure substances. Which of the following describes **all** pure substances?

A. A pure substance consists of only one type of element.

B. A pure substance has a definite chemical composition.

C. A pure substance cannot be broken down into simpler substances.

D. A pure substance is normally found as a solid at room temperature.

16 The drawing below represents a bit used in a power drill.

Which of the following metals is **most** suitable for making this drill bit?

A. aluminum

B. copper

C. gold

D. steel

17 Which of the following is performed by the quality control division of a company that is manufacturing a chair?

A. applying the varnish

B. assembling the parts

C. cutting the material

D. inspecting the finish

DIRECTIONS
Questions 18 and 19 are open-response questions.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 18 in the space provided in your Student Answer Booklet.

18   Two different bars of soap are being investigated by a group of students. They measured the mass and volume of each bar and recorded the results in the table below.

Soap	Mass (g)	Volume (cm³)
A	110	100
B	95	100

Density of water = 1.0 g/cm³

a. Calculate the density of each bar of soap. Show your work.

b. The diagram below represents a container of water. In your Student Answer Booklet, copy the container of water as illustrated. Draw and label the positions that soap bar A and soap bar B would occupy if they were placed in this container.

Air

Water
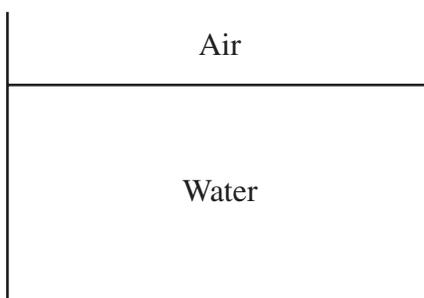
c. Explain why you drew each bar of soap in the position selected.

Write your answer to question 19 in the space provided in your Student Answer Booklet.

19 The diagram below shows a food web.
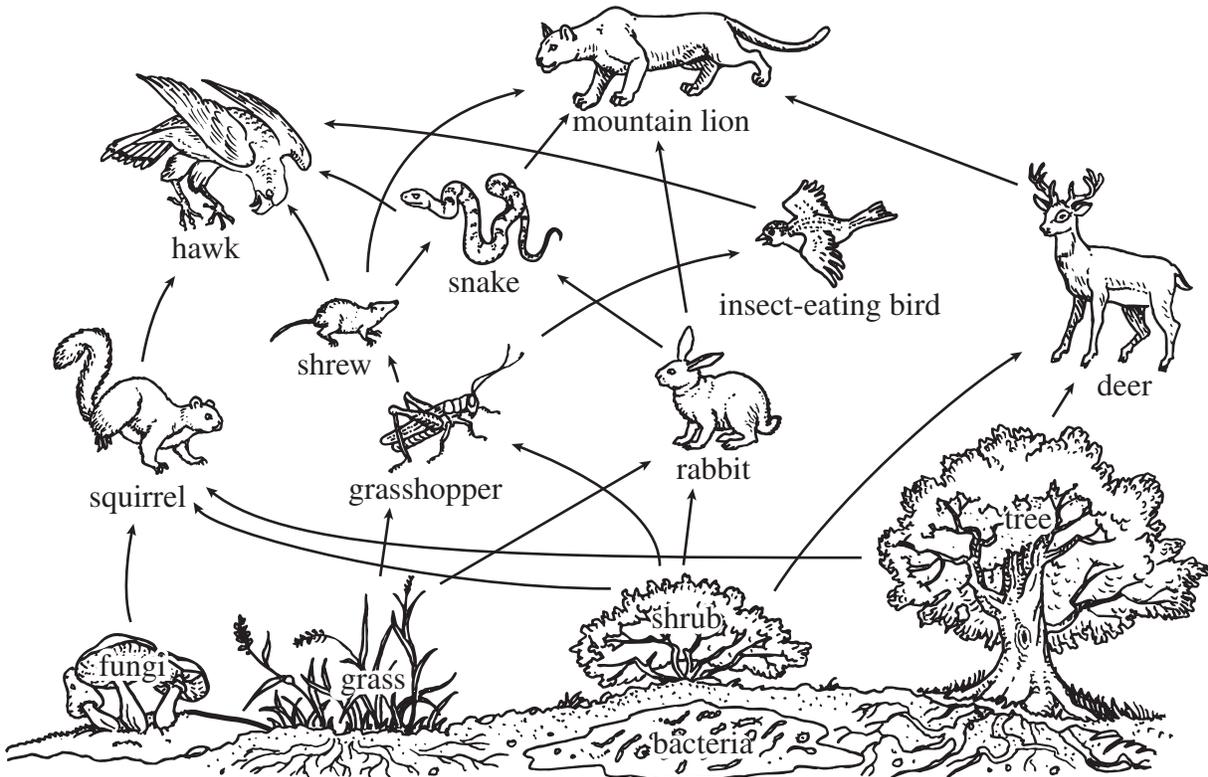
Members of this forest community get materials they need to survive from the ecosystem. These materials are constantly being recycled.

a. Explain the role of grass in this food web, and include in your response why it is at the bottom of the web.

b. What is the role of the grasshopper in this food web?

c. Explain what would happen to the population of snakes if the rabbits were suddenly removed from this ecosystem.

d. Explain what would happen to the grasshopper population if the insect-eating birds were suddenly removed from this ecosystem.

Science and Technology/Engineering

SESSION 2

DIRECTIONS
This session contains seventeen multiple-choice questions and three open-response questions.
Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

20 How many different elements are in the compound sodium carbonate (Na_2CO_3)?

A. 1

B. 3

C. 6

D. 7

21 Lightning from a thunderstorm strikes a tree that falls to the forest floor and dies. During the next few years the dead tree undergoes many changes.

What organisms are **most likely** responsible for the biological and chemical changes to the tree?

A. consumers

B. decomposers

C. predators

D. producers

22 The diagram below shows the supports of a proposed bridge.

Which of the following wooden bridge designs, if built from one support to the other, would withstand the heaviest load?

A.

B.

C.

D.
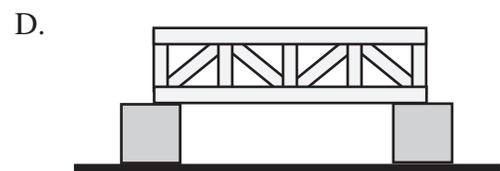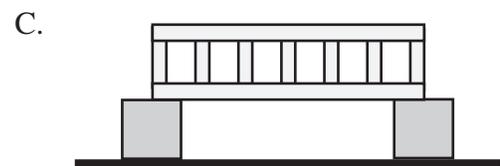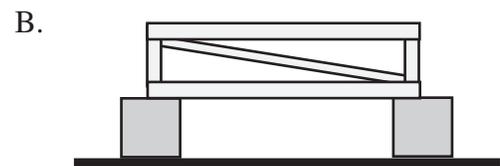
23 The axes below relate the temperature to the depth below Earth's surface.
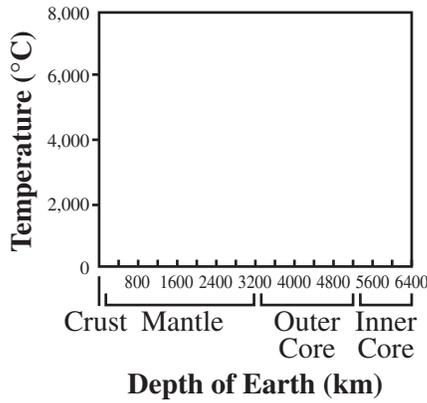
Which of the following graphs **best** represents temperatures inside Earth?

A.

B.

C.

D.
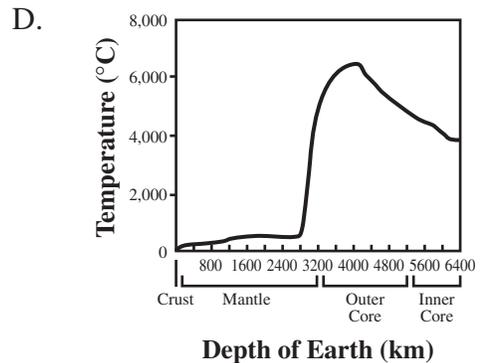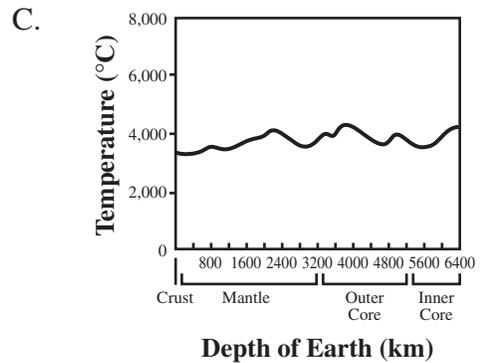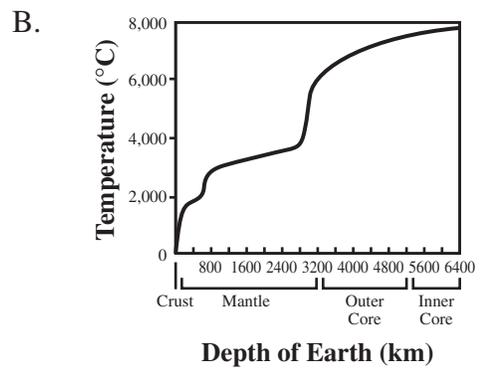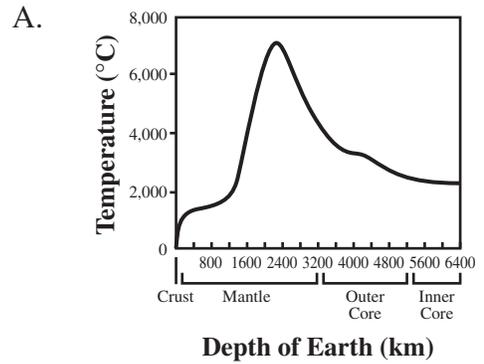
24 The diagram below shows a three-dimensional object.
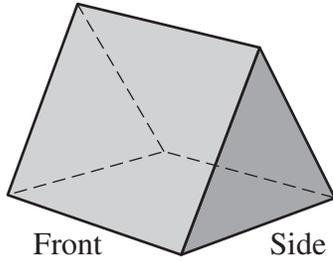
Front   Side

Which of the following diagrams correctly shows an orthographic projection of this three-dimensional object?

A.

Top

Front   Side

B.

Top

Front   Side

C.

Top

Front   Side

D.

Top

Front   Side

263

25 On Earth, Johanna weighs 100 lbs. She calculated what her weight would be at several other locations in the solar system. The results are shown in the table below.

Location in Solar System	Weight (lbs.)
Venus	90
Earth	100
Moon	16
Mars	40
Jupiter	260

Which of the following statements is **best** supported by the information in the table?

A. Venus has more gravitational force than Earth.

B. Mars has less gravitational force than the Moon.

C. Earth has four times the gravitational force of Mars.

D. Jupiter has more than twice the gravitational force of Earth.

26 The population of which of the following organisms would **most likely** decline if small animals like rats, rabbits, and snakes were eliminated from an ecosystem?

A. earthworms

B. grasses

C. hawks

D. mushrooms

27 In producing an automobile, which of the following is the **best** use of a robot?

A. to perform repetitive tasks

B. to determine the trunk space

C. to demonstrate passenger comfort

D. to perform quality control inspections

28 Which of the following is an example of heat transfer by conduction?

A. a whole metal spoon getting hot when one end is in hot soup

B. the inside of a car in the sun getting very hot

C. a tar road getting hotter in the sun than a concrete sidewalk

D. a fireplace fire heating a room on a cold day

29 The diagram below illustrates the motion of prevailing winds over oceans on Earth.
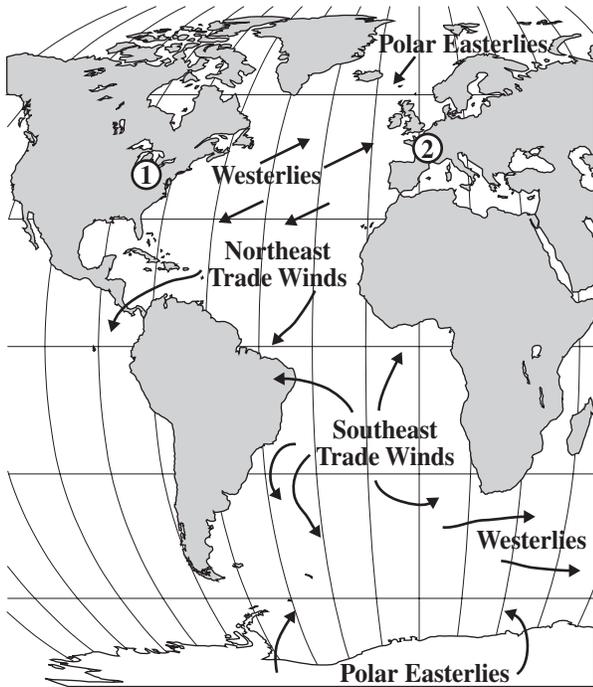
Key	
①	Eastern United States
②	Europe

If a sailboat sailed from the eastern United States to Europe and then back, which of the following winds would **most** directly power the sailboat?

A. Polar Easterlies going and Westerlies returning

B. Northeast Trade Winds going and Westerlies returning

C. Westerlies going and Northeast Trade Winds returning

D. Southeast Trade Winds going and Northeast Trade Winds returning

30 Which cellular organelle uses oxygen and glucose to provide energy to the cell?

A. mitochondrion

B. nucleus

C. ribosome

D. vacuole

31   The drawings below show skulls of three modern animals.

walrus

eared seal

true seal
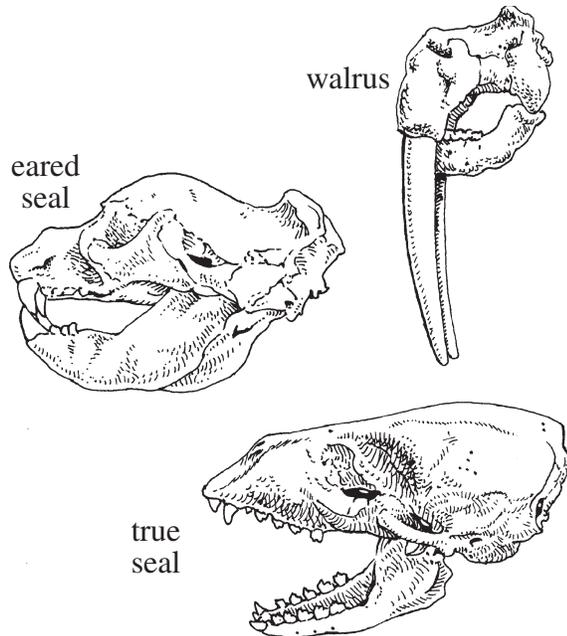
The three skulls all share characteristics with a fossil skull of an extinct seal (not shown) that is believed to be 23 million years old. What conclusion can be drawn about the relationship between the three modern animals and the fossil?

A. They are all the same species.

B. They share a common ancestor.

C. They share the same food supply.

D. They are all 23 million years old.

32   In order for a glider to fly, its weight must be opposed by

A. lift.

B. drag.

C. gravity.

D. friction.

33   The diagram below shows a cell.
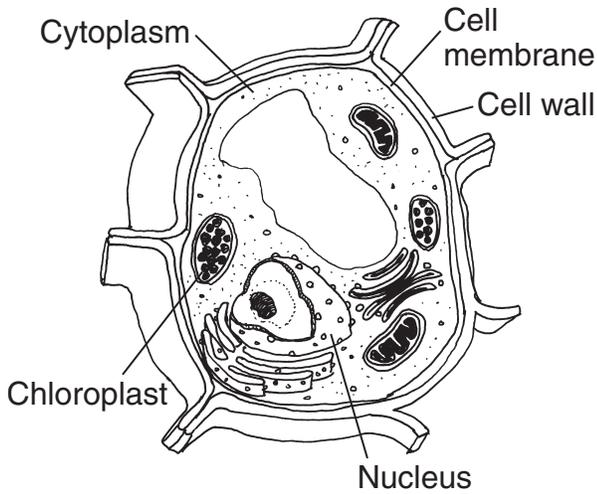
Where would this cell **most likely** be found?

A. bark

B. frog

C. leaf

D. mushroom

34   The drawing below shows a wooden crate.
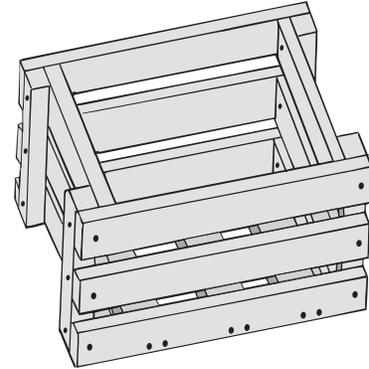
Which of the following sets of equipment is **most** appropriate to design and construct this wooden crate?

A. hammer, wrench, electric drill, sander

B. electric drill, nails, chisel, screwdriver

C. measuring tape, hand saw, nails, hammer

D. electric stapler, pliers, yardstick, screwdriver

35 When dense, cold air pushes beneath warmer atmospheric air, the lighter, warmer air rises. As this air rises into the atmosphere, it cools and some of the water vapor in it condenses.

Which of the following will **most likely** form as this occurs?

A. a cloud

B. a rainbow

C. a sunset

D. a tornado

36 Four containers of water with different temperatures are placed on a table as shown below. The temperature of the room is 25°C.

| 75°C | 50°C | 25°C | 10°C |
| **W** | **X** | **Y** | **Z** |
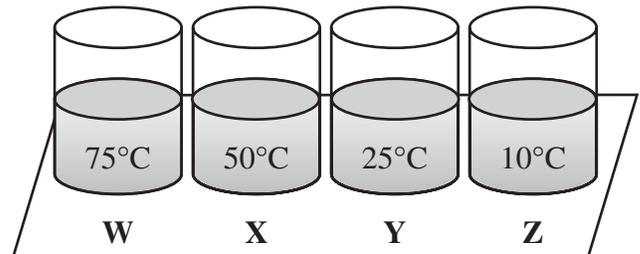
After four hours, which beaker of water will have exchanged the **most** heat energy with the environment?

A. W

B. X

C. Y

D. Z

DIRECTIONS
Questions 37 through 39 are open-response questions.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 37 in the space provided in your Student Answer Booklet.

37   The illustration below is a topographic map with two landforms labeled A and B.
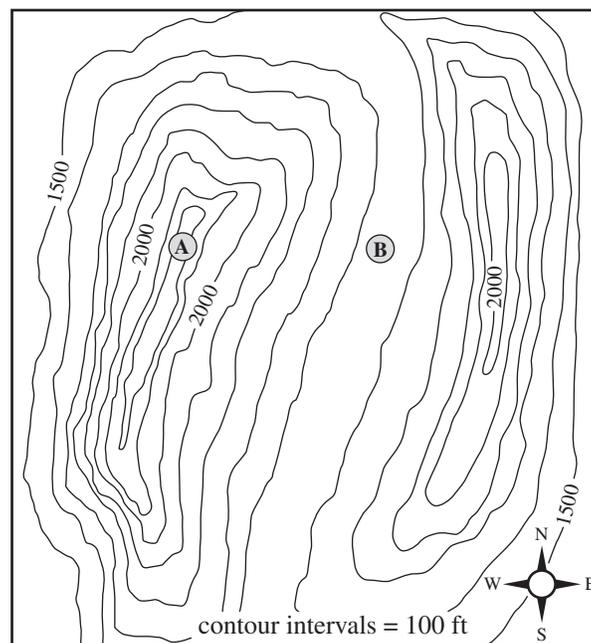
a. Identify the landform shown at point A. Describe how the contour lines and elevations are used to represent the features of this landform.

b. Identify the landform shown at point B. Describe how the contour lines and elevations are used to represent the features of this landform.

Write your answer to question 38 in the space provided in your Student Answer Booklet.

38 The graph below relates distance to time for a jogger on a morning run.

Distance vs. Time
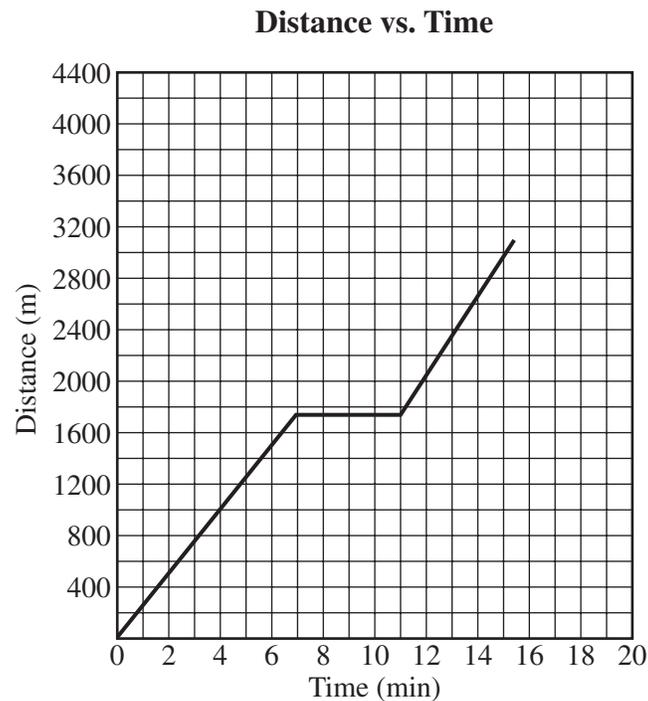
Juan is on a morning jog. His speed is represented in the graph.

a. At what rate of speed is Juan running between 4 min and 6 min?

b. According to this graph, what can you tell about Juan's motion between 7 min and 11 min?

c. If Juan had maintained the same speed as in the first 7 min, how long would it have taken him to run 3000 m? Explain your answer.

Write your answer to question 39 in the space provided in your Student Answer Booklet.

39 A communication link between a Coast Guard patrol boat and its base station is shown below.

Satellite

Dish

Boat

Base station

(not to scale)
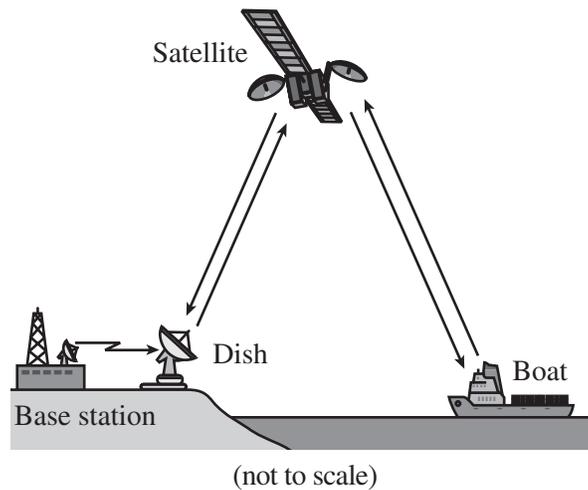
The boat uses the satellite to communicate its position to the base station.

a. Explain the purpose of a decoder in a communication system.

b. Identify **one** of the decoders in this system and describe how it is used.

c. Explain the purpose of a transmitter in a communication system.

d. Identify **one** of the examples of a transmitter in this system. For the transmitter you have identified, explain its specific role.

Grade 8 Science and Technology/Engineering
Spring 2005 Released Items:
Reporting Categories, Standards, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC)*
1	252	*Life Science (Biology)*	1	C
2	252	*Earth and Space Science*	2	C
3	252	*Technology/Engineering*	7.1	A
4	252	*Physical Science (Chemistry and Physics)*	10	B
5	253	*Earth and Space Science*	10	D
6	253	*Life Science (Biology)*	17	A
7	253	*Earth and Space Science*	3	C
8	254	*Life Science (Biology)*	18	B
9	255	*Physical Science (Chemistry and Physics)*	13	D
10	255	*Earth and Space Science*	9	B
11	256	*Physical Science (Chemistry and Physics)*	11	B
12	256	*Earth and Space Science*	10	C
13	257	*Technology/Engineering*	5.3	C
14	257	*Physical Science (Chemistry and Physics)*	9	B
15	257	*Physical Science (Chemistry and Physics)*	8	B
16	258	*Technology/Engineering*	1.1	D
17	258	*Technology/Engineering*	4.4	D
18	259	*Physical Science (Chemistry and Physics)*	2	
19	260	*Life Science (Biology)*	14	
20	261	*Physical Science (Chemistry and Physics)*	5	B
21	261	*Life Science (Biology)*	15	B
22	261	*Technology/Engineering*	5.4	D
23	262	*Earth and Space Science*	2	B
24	263	*Technology/Engineering*	2.2	A
25	264	*Physical Science (Chemistry and Physics)*	1	D
26	264	*Life Science (Biology)*	14	C
27	264	*Technology/Engineering*	4.2	A
28	264	*Physical Science (Chemistry and Physics)*	16	A
29	265	*Earth and Space Science*	4	C
30	265	*Life Science (Biology)*	4	A
31	266	*Life Science (Biology)*	11	B
32	266	*Technology/Engineering*	6.4	A
33	267	*Life Science (Biology)*	3	C
34	267	*Technology/Engineering*	2.4	C
35	268	*Earth and Space Science*	4	A
36	268	*Physical Science (Chemistry and Physics)*	16	A
37	269	*Earth and Space Science*	1	
38	270	*Physical Science (Chemistry and Physics)*	12	
39	271	*Technology/Engineering*	3.1	

* Answers are provided here for multiple-choice items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.

XII. Biology, Grade 10

Grade 10 Biology Pilot Test

The spring 2005 Grade 10 MCAS Biology Test was based on learning standards in the Biology content strand of the Massachusetts *Science and Technology/Engineering Curriculum Framework* (2001). These learning standards appear on pages 49–51 of the *Framework*.

The *Science and Technology/Engineering Curriculum Framework* is available on the Department Web site at www.doe.mass.edu/frameworks/scitech/2001/0501.pdf.

Because the Grade 10 Biology Test was administered as a pilot test this year, the reporting of results is limited to *Test Item Analysis Reports*. No scaled score or performance level results are available.

Test Sessions and Content Overview

The MCAS Grade 10 Biology Test included two separate test sessions. Each session included multiple-choice and open-response questions.

Reference Materials and Tools

The Grade 10 Biology Test was designed to be taken without the aid of a calculator. Students were allowed to have calculators with them during testing, but calculators were not needed to answer questions. No other reference tools or materials were allowed.

The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only, during both test sessions.

Cross-Reference Information

The table at the conclusion of this chapter indicates the *Framework* learning standard that each item assesses. The correct answers for multiple-choice questions are also displayed in the table.

Biology

SESSION 1

DIRECTIONS

This session contains ten multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet. You may work out solutions to multiple-choice questions in the test booklet.

1 The diagram below shows a generalized cycle in sexually reproducing animals.
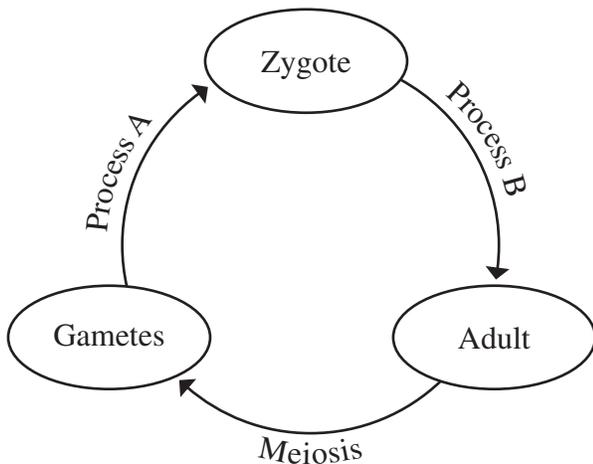
What is Process A in this cycle?

A. fertilization

B. mitosis

C. osmosis

D. replication

2 In comparisons of the evolutionary relationships between four species of birds, which of the following would be **most** useful?

A. color of feathers

B. gene sequences

C. nesting behaviors

D. patterns of migration

3   Genetic information for a breed of chicken is shown below.

Frizzle Fowl

Types of Chickens with Different Feathers	
Genotype	**Phenotype**
FF	Normal (Normal feathers)
Ff	Frizzle fowl (Curly feathers)
ff	Feather shedder (Loses feathers easily)

Which of the following crosses of chickens will produce **only** Frizzle fowl offspring?

A. Normal × Frizzle fowl

B. Frizzle fowl × Frizzle fowl

C. Normal × Feather shedder

D. Feather shedder × Feather shedder

4 Plants use many gallons of water every day. Almost all of the water used by plants is absorbed through the roots. Water leaves plants by which process?

A. infiltration

B. precipitation

C. runoff

D. transpiration

5 The table below shows the elemental composition of three different types of organisms.

Elemental Composition of Selected Organisms (percent by weight)

Element	Human	Alfalfa	*E. coli* Bacterium
O	65.0	77.9	73.7
C	18.5	11.3	12.1
H	9.5	8.7	9.9
X	3.3	0.8	3.0
P	1.0	0.7	0.6
S	0.3	0.1	0.3
Total	97.6%	99.5%	99.6%

The X in the table represents which of the following elements?

A. calcium (Ca)

B. iron (Fe)

C. nitrogen (N)

D. sodium (Na)

6 The diverse organisms shown in the diagram below belong to the same Kingdom.
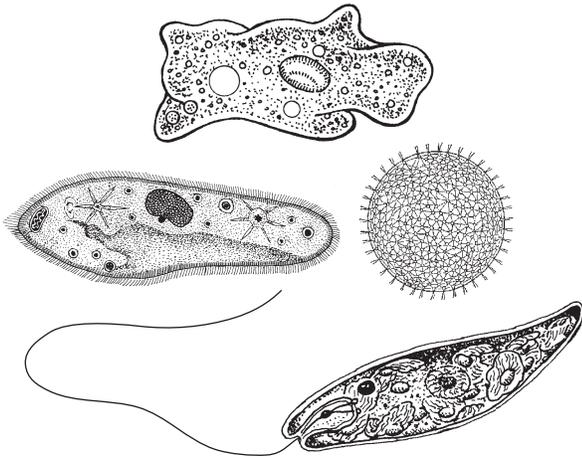
To which Kingdom do these organisms belong?

A. Animalia

B. Fungi

C. Plantae

D. Protista

7 Along the Pacific coast of North America, there are at least seven subspecies of *Ensatina eschscholtzii* salamanders. All of them descended from a common ancestral population. As the species spread, subpopulations adapted to their local environments.

Which of the following **must** have increased as a result of these adaptations?

A. the number of chromosomes in each salamander

B. the size of each salamander in the total population

C. the biodiversity of the total salamander population

D. the number of offspring produced by each salamander

Question 8 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 8 in the space provided in your Student Answer Booklet.

8   The box below shows a list of supplies that are available in a laboratory.

- four flasks with stoppers
- floodlight
- tap water
- graduated cylinders
- small aquarium plants
- four small fish
- bromthymol blue (a chemical indicator that changes color from blue to yellow as the level of carbon dioxide in a solution increases)

The class sets up an experiment with the four flasks as shown.

Flask 1: 100 mL water, 1 mL bromthymol blue, plant
Flask 2: 100 mL water, 1 mL bromthymol blue, 2 small fish
Flask 3: 100 mL water, 1 mL bromthymol blue, 2 small fish, plant
Flask 4: 100 mL water, 1 mL bromthymol blue
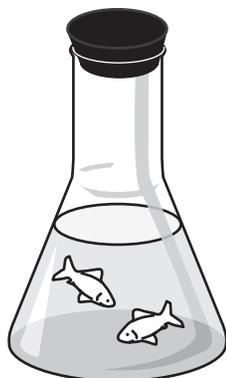
Flask 1   Flask 2   Flask 3   Flask 4
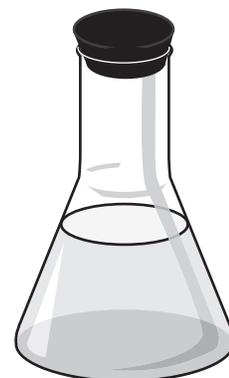
All four flasks are stoppered and placed under the floodlight.

a.   What color would the solution in **each** flask be after a few hours?

b.   Explain how the processes that have occurred in **each** flask result in the observed color of the bromthymol blue solutions.

Mark your answers to multiple-choice questions 9 through 11 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet, but you may work out solutions to multiple-choice questions in the test booklet.

9 DNA and RNA are similar because they both contain

   A. deoxyribose.

   B. nucleotides.

   C. thymine.

   D. double helices.

10 Four students attempted to classify organisms into the Plant and Animal Kingdoms. Their classifications are shown in the table below.

	Plants	**Animals**
Student 1	Eukaryotic cells	Prokaryotic cells
Student 2	Multicellular	Unicellular
Student 3	Cells have cell walls	Cells do not have cell walls
Student 4	Heterotrophic by absorption	Heterotrophic by ingestion

Which student's classification correctly separates organisms into these two Kingdoms?

   A. Student 1

   B. Student 2

   C. Student 3

   D. Student 4

11 The diagram below shows a food web.
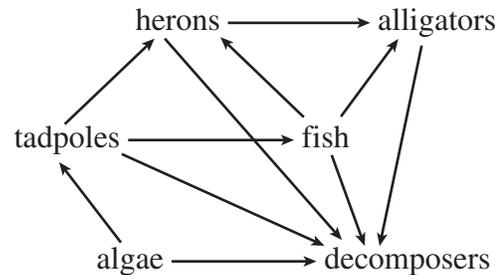
Which population would **probably** increase if the tadpole population decreased?

   A. herons

   B. alligators

   C. fish

   D. algae

Biology

SESSION 2

DIRECTIONS
This session contains ten multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet. You may work out solutions to multiple-choice questions in the test booklet.

12 Many animals have internal or external skeletons that provide support and structure. Which of the following parts of plant cells play a similar role?

A. cell membranes

B. cell walls

C. chloroplasts

D. cytoplasm

13 The picture below shows two dogs and their puppies.

Female Male
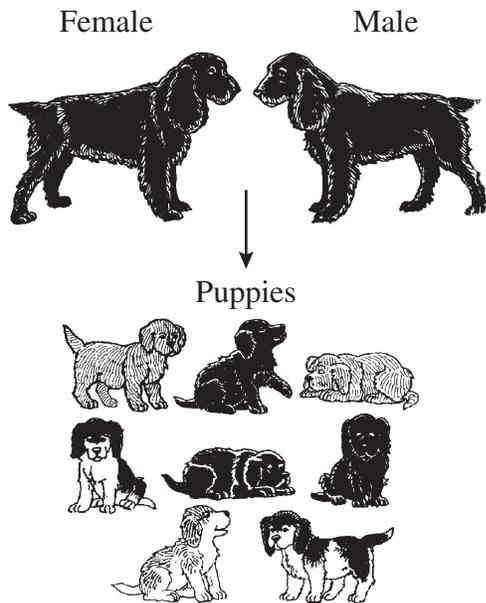
Puppies

The parent dogs are each heterozygous for two traits: fur color and white spotting. Both parent dogs are solid black. Their puppies, however, have four different phenotypes as listed below.

• solid black
• black with white spots
• solid red
• red with white spots

Which of the following explains how these parent dogs can produce puppies with these four phenotypes?

A. The genes for these traits are sex-linked.

B. The genes for these traits mutate frequently.

C. The genes for these traits assort independently.

D. The genes for these traits are on the same chromosome.

14 A food web is shown below.
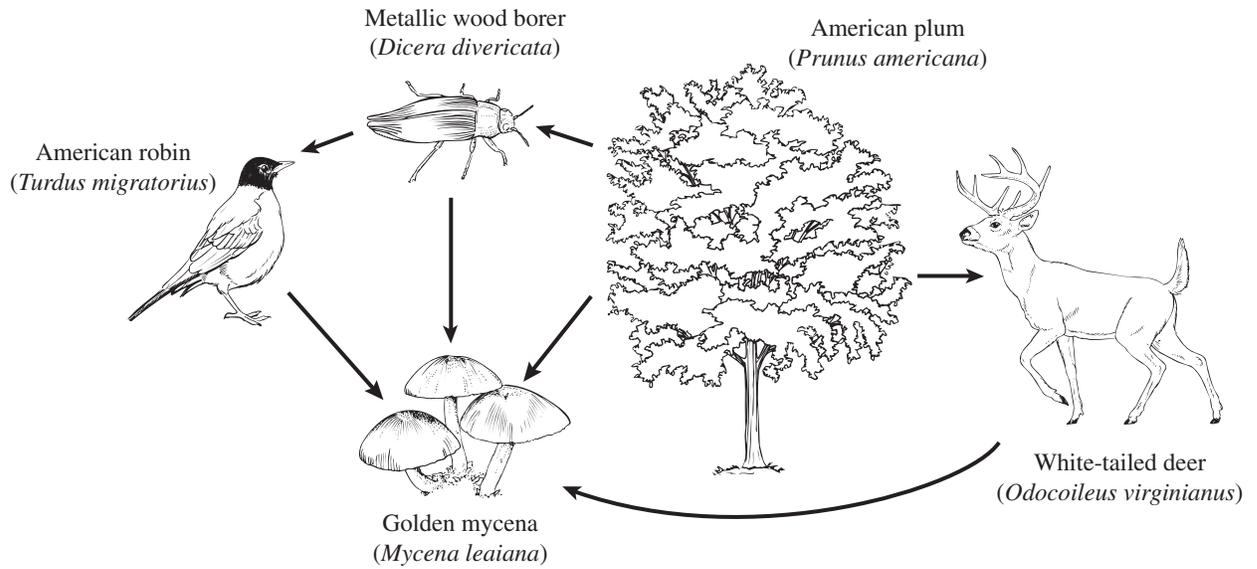
Which organism in this food web is a decomposer?

A. American plum

B. golden mycena

C. metallic wood borer

D. white-tailed deer

15 The figure below represents the flow of food energy through a system.

Chickens

Grain

Wolves

In an experiment, chickens were fed grain that contained a chemical marker in its proteins. The presence of the marker can be detected in organisms.

Which of the following is the **most** reasonable prediction from this experiment?

A. The marker will only be found in the grain.

B. Both chickens and wolves will have the marker.

C. Wolves will have the marker, but chickens will not.

D. The marker will only be found in the animals' wastes.

16 Cyanide is a powerful poison because it inhibits an enzyme in mitochondria, preventing the transfer of energy during one of the steps in cellular respiration. This poison would **directly** affect the production of which of the following molecules?

A. ATP

B. glucose

C. oxygen

D. RNA

17 The structure of an organic molecule is represented below.

$$H-\overset{\overset{\displaystyle H}{|}}{\underset{\underset{\displaystyle OH}{|}}{X}}-\overset{\overset{\displaystyle OH}{|}}{\underset{\underset{\displaystyle H}{|}}{X}}-\overset{\overset{\displaystyle H}{|}}{\underset{\underset{\displaystyle OH}{|}}{X}}-X\overset{H}{\underset{O}{}}$$

In this organic molecule, which element is identified by each X?

A. iron

B. carbon

C. sodium

D. phosphorus

Question 18 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 18 in the space provided in your Student Answer Booklet.

18   The chart below shows some triplets from a DNA sequence (codons) and their corresponding amino acids.

DNA Codon	Amino Acid
AGA	Arginine
AGG	Arginine
AGC	Serine
AGT	Serine
GGA	Glycine
GGT	Glycine
GGC	Glycine
GGG	Glycine
TTG	Leucine
TGG	Tryptophan
TCG	Serine
TCT	Serine

A sequence of DNA in a gene reads **GGT TCG AGA**.

a. What is the sequence of amino acids that is produced when this gene is translated?

b. If the DNA is mutated to read **GGT TGG AGC**, what will the sequence of amino acids be?

c. Rewrite the original DNA sequence with a single mutation that would **not** change the sequence of amino acids.

d. Explain how a mutation can change the DNA but not change the amino acid sequence.

Mark your answers to multiple-choice questions 19 through 22 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet, but you may work out solutions to multiple-choice questions in the test booklet.

19 The diagrams below show changes in a desert lizard population.
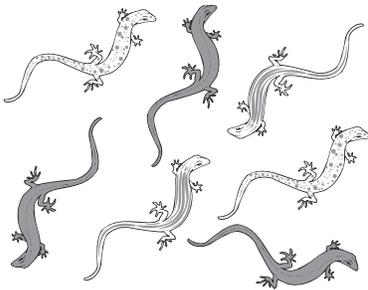
1. Population with variety of inherited traits
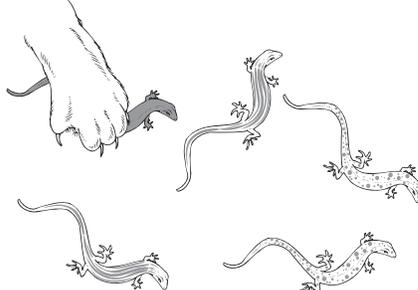
2. Predation of individuals with particular traits
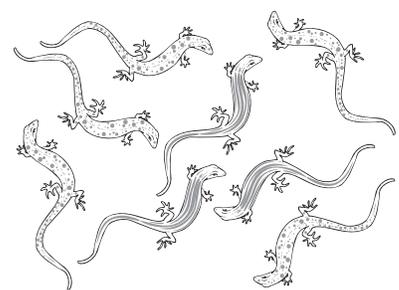
3. Reproduction of survivors

Which biological concept is illustrated?

A. polygenic traits

B. natural selection

C. sex-linked inheritance

D. silent mutations

20 Which of the following is an example of a prokaryotic organism?

A. bacterium

B. celery

C. horse

D. mushroom

21 The natural cycling of oxygen between organisms and their environment is **most** directly accomplished through which of the following pairs of processes?

A. fermentation and oxidation

B. transpiration and evaporation

C. precipitation and condensation

D. photosynthesis and respiration

22 The reaction catalyzed by the bacterial enzyme ß-galactosidase forms a dark-colored end-product when the cells are grown on a particular agar medium. As more product is formed, the cells become darker.

Students performed an experiment to determine the optimum pH for activity of this enzyme. Their results are shown in the illustration of bacterial colonies below.

Bacterial Colony Color as a Function of pH

pH 3   pH 5   pH 7   pH 9   pH 11
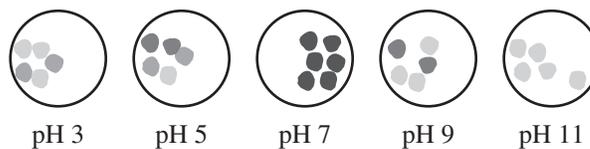
Based on these data, the students should conclude that ß-galactosidase functions **best** at which pH?

A. 5

B. 7

C. 9

D. 11

Grade 10 Biology
Spring 2005 Released Items:
Standards and Correct Answers

Item No.	Page No.	Standard	Correct Answer (MC)*
1	275	3.8	A
2	275	5.1	B
3	276	3.7	C
4	277	6.1	D
5	277	1.2	C
6	278	5.3	D
7	278	5.2	C
8	279	2.9	
9	280	1.3	B
10	280	5.3	C
11	280	6.2	D
12	281	2.1	B
13	282	3.6	C
14	283	6.2	B
15	284	2.7	B
16	284	2.8	A
17	284	1.1	B
18	285	3.4	
19	286	5.2	B
20	287	2.2	A
21	287	6.1	D
22	287	1.5	B

* Answers are provided here for multiple-choice items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.

XIII. Chemistry, Grade 10

Grade 10 Chemistry Pilot Test

The spring 2005 Grade 10 MCAS Chemistry Test was based on learning standards in the Chemistry content strand of the Massachusetts *Science and Technology/Engineering Curriculum Framework* (2001). These learning standards appear on pages 63–67 of the *Framework*.

The *Science and Technology/Engineering Curriculum Framework* is available on the Department Web site at www.doe.mass.edu/frameworks/scitech/2001/0501.pdf.

Because the Grade 10 Chemistry Test was administered as a pilot test this year, the reporting of results is limited to *Test Item Analysis Reports*. No scaled score or performance level results are available.

Test Sessions and Content Overview

The MCAS Grade 10 Chemistry Test included two separate test sessions. Each session included multiple-choice and open-response questions.

Reference Materials and Tools

Each student taking the Grade 10 Chemistry Test was provided with a *Chemistry Formula and Constants Sheet/Periodic Table of the Elements*. Copies of both sides of this reference sheet follow the final question in this chapter.

Each student also had sole access to a calculator with at least four functions and a square root key. No other reference tools or materials were allowed.

The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only, during both Chemistry test sessions.

Cross-Reference Information

The table at the conclusion of this chapter indicates the *Framework* learning standard that each item assesses. The correct answers for multiple-choice questions are also displayed in the table.

Chemistry

SESSION 1

DIRECTIONS

This session contains ten multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet. You may work out solutions to multiple-choice questions in the test booklet.

1 A solid cube was put into a cylinder containing four liquids with different densities as shown below.

Substance A = 1.50 g/cm³

Substance B = 3.50 g/cm³

Substance C = 6.0 g/cm³

Substance D = 9.0 g/cm³
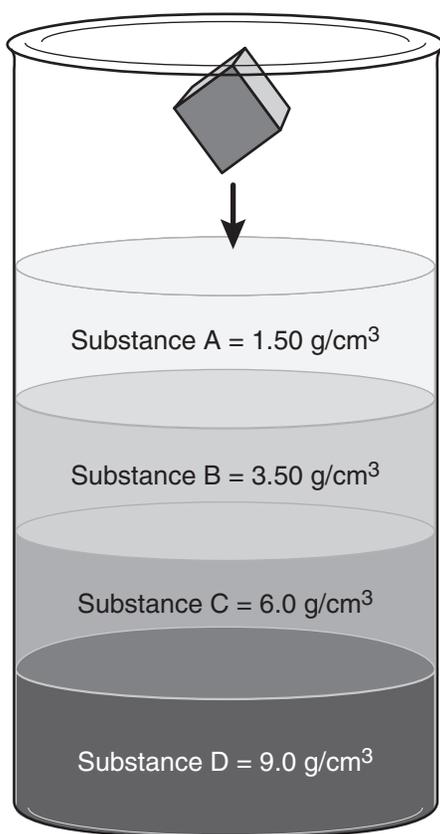
The cube fell quickly through layer A, fell slowly through layer B, and stopped upon reaching layer C. The density of the cube **most likely** lies between

A. 1.00 and 1.50 g/cm³.

B. 1.51 and 3.50 g/cm³.

C. 3.51 and 6.00 g/cm³.

D. 6.00 and 9.00 g/cm³.

2 The correct name for an aqueous solution of HCl is

A. chloric acid.

B. chlorous acid.

C. hydrochloric acid.

D. hydrogen chloride.

3 The solubility of a substance can be described in a variety of ways. Some references may use descriptive terms for solubility, such as those in the table illustrated below.

Descriptive terms	Parts of solvent needed for 1 part solute
Very soluble	<1
Freely soluble	1–10
Soluble	10–30
Sparingly soluble	30–100
Slightly soluble	100–1,000
Very slightly soluble	1,000–10,000
Practically insoluble or insoluble	>10,000

Using the table above as a reference, what descriptive term would be used for a medication that required 4,000 mg of water to dissolve 200 mg of the drug?

A. soluble

B. slightly soluble

C. sparingly soluble

D. very slightly soluble

4 Potassium carbonate (K_2CO_3) is an important component of fertilizer. The partially balanced equation for the reaction of 6 moles of potassium hydroxide (KOH) and 3 moles of carbon dioxide (CO_2) to produce potassium carbonate and water is given below.

$$6KOH + 3CO_2 \rightarrow \_\_K_2CO_3 + 3H_2O$$

When this equation is balanced, what is the coefficient for potassium carbonate?

A. 2

B. 3

C. 6

D. 9

5   The figure below represents the periodic table and the location of four different elements on the table.

A certain element has a ground state electron configuration of $1s^2 2s^2 2p^6 3s^2 3p^6$. Which letter in the diagram above represents the position of this element on the periodic table?

A. Y

B. W

C. X

D. Z

6   The equation for a chemical reaction is shown below.

$$C(s) + 2H_2(g) \rightleftharpoons CH_4(g) + heat$$

Which of the following actions will produce a shift of the reaction to the left?

A. removing CH_4 from the system

B. increasing the pressure at which the reaction is performed

C. increasing the temperature at which the reaction is performed

D. increasing the amount of H_2 used

7   A student was assigned to take water samples from a lake near his home. He measured the pH of one of the water samples to be 6.0. Which of the following **best** describes this sample of water?

A. highly acidic

B. slightly acidic

C. highly basic

D. slightly basic

Question 8 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 8 in the space provided in your Student Answer Booklet.

8   Several chemists examined a pure, unknown substance and observed and measured its physical properties. Their results are shown below.

Unknown Substance

Physical Property	Description or Value
Color	Clear and colorless
Flammability	None
Odor	Sweet, distinctive odor
Melting point	–22.9°C
Boiling point	76.74°C
Density at 20°C	1.585 g/cm^3
Water solubility at 20°C	0.08 g/100 g H_2O

Based on the data recorded in the table, answer the following.

a. What is the physical state of this substance at room temperature? Explain how the information in the table is used to make this classification of the substance's state.

b. The substance is unreactive in water. What will happen if 10.00 g of this substance is added to 200. g of water at 20°C and standard pressure? Explain your response.

Mark your answers to multiple-choice questions 9 through 11 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet, but you may work out solutions to multiple-choice questions in the test booklet.

9 Which of the following graphs **best** represents how the average kinetic energy of molecules changes with absolute temperature?

A.

B.

C.

D.
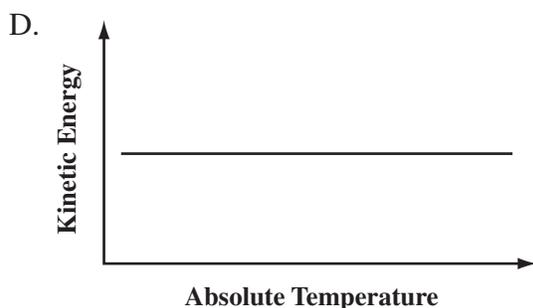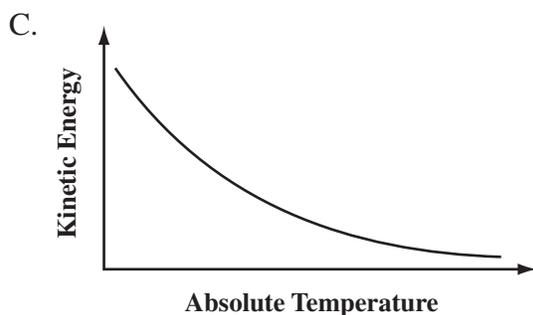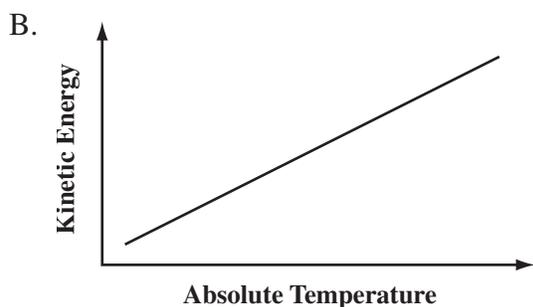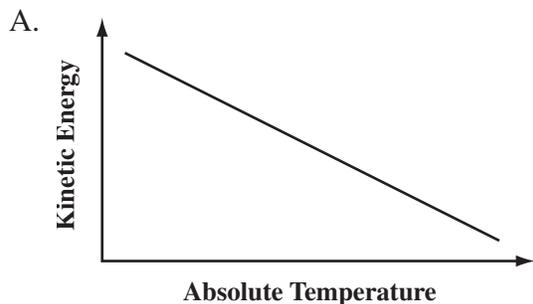
10 How many moles of oxygen atoms are present in 2 moles of $Mg_3(PO_4)_2$?

A. 4

B. 8

C. 12

D. 16

11 When elements from group 1 (1A) combine with elements from group 17 (7A), they produce compounds. Which of the following is the correct combining ratio between group 1 (1A) elements and group 17 (7A) elements?

A. 1:1

B. 1:2

C. 2:1

D. 3:2

Chemistry

SESSION 2

DIRECTIONS
This session contains ten multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet. You may work out solutions to multiple-choice questions in the test booklet.

12 The illustration below shows two atoms of a fictitious element (M) forming a diatomic molecule.

$$:\!\overset{\bullet\bullet}{\underset{\bullet\bullet}{M}}\!\bullet \; + \; \bullet\!\overset{\bullet\bullet}{\underset{\bullet\bullet}{M}}\!: \; \longrightarrow \; :\!\overset{\bullet\bullet}{\underset{\bullet\bullet}{M}}\!:\!\overset{\bullet\bullet}{\underset{\bullet\bullet}{M}}\!:$$

What type of bonding occurs between these two atoms?

A. covalent

B. ionic

C. nuclear

D. polar

13 A student pours mineral salts into a bottle of cold water. Which of the following **best** explains why shaking the bottle will affect the dissolving rate of the salt?

A. Shaking exposes the salts to the solvent more quickly.

B. Shaking helps more water to evaporate.

C. Shaking causes more ions to precipitate out of solution.

D. Shaking equalizes the water temperature.

297

14 Which of the following elements can form an anion that contains 54 electrons, 74 neutrons, and 53 protons?

A.
(262)
Bh
107
Bohrium

B.
126.905
I
53
Iodine

C.
183.85
W
74
Tungsten

D.
131.29
Xe
54
Xenon
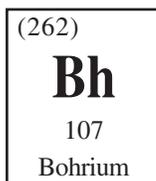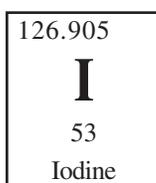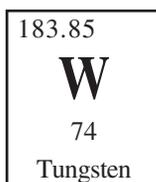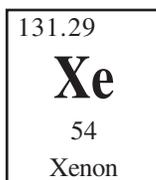
15   The table below shows pH values of some foods.

pH Values of Some Important Foods

Vegetables	pH	Citrus	pH	Dairy/Egg	pH	Starches	pH
Asparagus	5.6	Grapefruit	3.2	Butter	6.2	Bread (white)	5.5
Beans	5.5	Lemons	2.3	Cheese	5.6	Corn	6.2
Peas	6.1	Limes	1.9	Eggs (fresh)	7.8	Crackers	7.5
Spinach	5.4	Oranges	3.5	Milk	6.5	Potatoes	5.8

A patient has chronic indigestion due to an overproduction of stomach acid. Which foods should the patient avoid until the condition is resolved?

A. vegetables

B. citrus

C. dairy/egg

D. starches

16 A student bends a paperclip rapidly back and forth. When he touches the point where he was bending the paperclip, he finds that its temperature has increased. This indicates that the atoms in that part of the paperclip have increased in

A. conductivity.

B. kinetic energy.

C. mass.

D. number.

17 Which of the following graphs **best** shows the relationship between an element's atomic mass and its atomic number?

A.
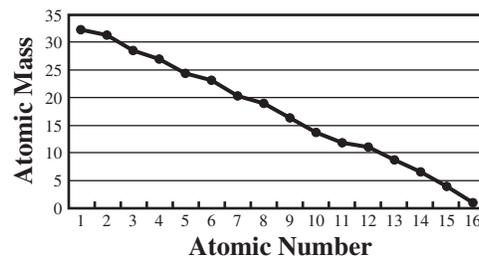
B.
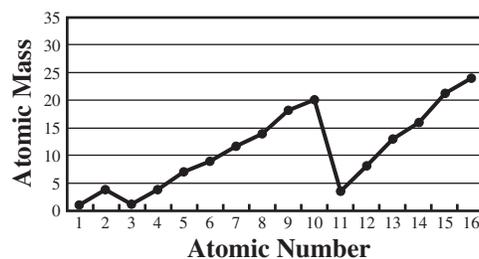
C.
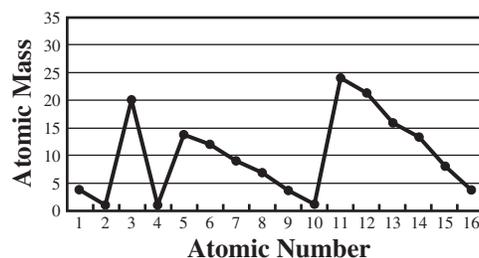
D.
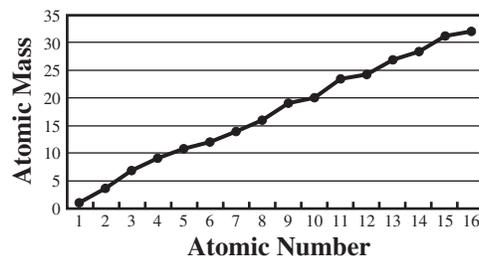
Question 18 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 18 in the space provided in your Student Answer Booklet.

18 A student burned a sample of pure carbon in an open crucible. The carbon reacted with oxygen in the air and produced carbon dioxide.

a. In your Student Answer Booklet, write the balanced equation for the complete combustion of carbon.

b. The student observed no visible products. Why does it appear that the law of conservation of mass was violated by this reaction?

c. If one mole of carbon is burned, how many moles of oxygen gas will be consumed and how many moles of product should be obtained? Explain how you determined these values.

Mark your answers to multiple-choice questions 19 through 22 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet, but you may work out solutions to multiple-choice questions in the test booklet.

19 A picture of a balloon is shown below.

If the temperature of this balloon were to decrease suddenly, how would the balloon change?

A. Its mass would increase.

B. Its mass would decrease.

C. Its volume would increase.

D. Its volume would decrease.

20 Aluminum reacts vigorously and exothermically with copper(II) chloride. Which of the following is the balanced equation for this reaction?

A. $Al + CuCl_2 \rightarrow AlCl_3 + Cu$

B. $Al + 3CuCl_2 \rightarrow 2AlCl_3 + Cu$

C. $2Al + 3CuCl_2 \rightarrow 2AlCl_3 + 3Cu$

D. $3Al + 2CuCl_2 \rightarrow 3AlCl_3 + 2Cu$

21   A data table and two prepared beakers are shown below.

Temperature (°C)	Solubility of KNO_3 in 100 g H_2O
10	22 g
20	33 g
30	48 g
40	65 g
50	84 g
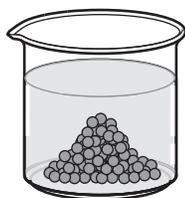
Beaker A   **Beaker B**

10 g KNO_3 10 g KNO_3

100 g H_2O 100 g H_2O

10°C   50°C

Solid KNO_3 was added to each beaker. Each beaker was stirred at the same rate until all of the solid dissolved. The table shows the solubilities of KNO_3 at different temperatures. How will the rates of dissolving compare?

A. KNO_3 will dissolve faster in Beaker B because of increased surface area.

B. KNO_3 will dissolve faster in Beaker A because the water molecules are farther apart.

C. KNO_3 will dissolve faster in Beaker B because the overall kinetic energy is increased.

D. KNO_3 will dissolve at the same rate in Beaker A and Beaker B because the concentrations are the same.

---

22   Which of the following represents a double displacement reaction?

A. $ABC \rightarrow AB + C$

B. $A + B \rightarrow AB$

C. $AB + CD \rightarrow AD + CB$

D. $A + BC \rightarrow AC + B$
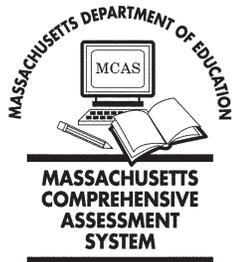
Massachusetts Comprehensive Assessment System
Chemistry Formula and Constants Sheet

Common Polyatomic Ions

Ion	Ionic Formula
Ammonium	NH_4^+
Carbonate	CO_3^{2-}
Hydroxide	OH^-
Nitrate	NO_3^-
Phosphate	PO_4^{3-}
Sulfate	SO_4^{2-}

Ideal Gas Law: $PV = nRT$

Absolute Temperature Conversion: $K = °C + 273$

Definition of pH: $pH = -\log [H_3O^+]$

Specific Heat of Water: $c_{H_2O} = 1.00\ \text{cal/g} \cdot °C = 4.18\ \text{J/g} \cdot °C$

Mole-Volume of Ideal Gas at STP: 22.4 L at STP

Ideal Gas Constant: $R = 0.0821\ \text{L} \cdot \text{atm/mol} \cdot K = 8.314\ \text{L} \cdot \text{kPa/mol} \cdot K$

Avogadro's number: 6.02×10^{23}

STP: 1 atm, 0°C

Nuclear Particles

Name	Symbol
Alpha particle	α or ^4_2He
Beta particle	β or $^0_{-1}e$
Neutron	$^1_0 n$

Massachusetts Comprehensive Assessment System

Periodic Table of the Elements

Group (Family)

1A 1	2A 2	3B 3	4B 4	5B 5	6B 6	7B 7	8B 8	8B 9	8B 10	1B 11	2B 12	3A 13	4A 14	5A 15	6A 16	7A 17	8A 18
1.00794 **H** 1 Hydrogen																	4.00260 **He** 2 Helium
6.941 **Li** 3 Lithium	9.01218 **Be** 4 Beryllium											10.81 **B** 5 Boron	12.0111 **C** 6 Carbon	14.0067 **N** 7 Nitrogen	15.9994 **O** 8 Oxygen	18.998403 **F** 9 Fluorine	20.179 **Ne** 10 Neon
22.98977 **Na** 11 Sodium	24.305 **Mg** 12 Magnesium											26.98154 **Al** 13 Aluminum	28.0855 **Si** 14 Silicon	30.97376 **P** 15 Phosphorus	32.06 **S** 16 Sulfur	35.453 **Cl** 17 Chlorine	39.948 **Ar** 18 Argon
39.0983 **K** 19 Potassium	40.08 **Ca** 20 Calcium	44.9559 **Sc** 21 Scandium	47.88 **Ti** 22 Titanium	50.9415 **V** 23 Vanadium	51.996 **Cr** 24 Chromium	54.9380 **Mn** 25 Manganese	55.847 **Fe** 26 Iron	58.9332 **Co** 27 Cobalt	58.69 **Ni** 28 Nickel	63.546 **Cu** 29 Copper	65.39 **Zn** 30 Zinc	69.72 **Ga** 31 Gallium	72.59 **Ge** 32 Germanium	74.9216 **As** 33 Arsenic	78.96 **Se** 34 Selenium	79.904 **Br** 35 Bromine	83.80 **Kr** 36 Krypton
85.4678 **Rb** 37 Rubidium	87.62 **Sr** 38 Strontium	88.9059 **Y** 39 Yttrium	91.224 **Zr** 40 Zirconium	92.9064 **Nb** 41 Niobium	95.94 **Mo** 42 Molybdenum	(98) **Tc** 43 Technetium	101.07 **Ru** 44 Ruthenium	102.906 **Rh** 45 Rhodium	106.42 **Pd** 46 Palladium	107.868 **Ag** 47 Silver	112.41 **Cd** 48 Cadmium	114.82 **In** 49 Indium	118.71 **Sn** 50 Tin	121.75 **Sb** 51 Antimony	127.60 **Te** 52 Tellurium	126.905 **I** 53 Iodine	131.29 **Xe** 54 Xenon
132.905 **Cs** 55 Cesium	137.33 **Ba** 56 Barium	138.906 **La** 57 Lanthanum	178.49 **Hf** 72 Hafnium	180.948 **Ta** 73 Tantalum	183.85 **W** 74 Tungsten	186.207 **Re** 75 Rhenium	190.2 **Os** 76 Osmium	192.22 **Ir** 77 Iridium	195.08 **Pt** 78 Platinum	196.967 **Au** 79 Gold	200.59 **Hg** 80 Mercury	204.383 **Tl** 81 Thallium	207.2 **Pb** 82 Lead	208.980 **Bi** 83 Bismuth	(209) **Po** 84 Polonium	(210) **At** 85 Astatine	(222) **Rn** 86 Radon
(223) **Fr** 87 Francium	226.025 **Ra** 88 Radium	227.028 **Ac** 89 Actinium	(261) **Rf*** 104 Rutherfordium	(262) **Db** 105 Dubnium	(263) **Sg** 106 Seaborgium	(262) **Bh** 107 Bohrium	(265) **Hs** 108 Hassium	(266?) **Mt** 109 Meitnerium	(269?) 110	111	112	113	114	115	116	117	118

Period: 1, 2, 3, 4, 5, 6, 7

Mass numbers in parentheses are those of the most stable or most common isotope.

Lanthanide Series

140.12 **Ce** 58 Cerium	140.908 **Pr** 59 Praseodymium	144.24 **Nd** 60 Neodymium	(145) **Pm** 61 Promethium	150.36 **Sm** 62 Samarium	151.96 **Eu** 63 Europium	157.25 **Gd** 64 Gadolinium	158.925 **Tb** 65 Terbium	162.50 **Dy** 66 Dysprosium	164.930 **Ho** 67 Holmium	167.26 **Er** 68 Erbium	168.934 **Tm** 69 Thulium	173.04 **Yb** 70 Ytterbium	174.967 **Lu** 71 Lutetium

Actinide Series

232.038 **Th** 90 Thorium	231.036 **Pa** 91 Protactinium	238.029 **U** 92 Uranium	237.048 **Np** 93 Neptunium	(244) **Pu** 94 Plutonium	(243) **Am** 95 Americium	(247) **Cm** 96 Curium	(247) **Bk** 97 Berkelium	(251) **Cf** 98 Californium	(252) **Es** 99 Einsteinium	(257) **Fm** 100 Fermium	(258) **Md** 101 Mendelevium	(259) **No** 102 Nobelium	(260) **Lr** 103 Lawrencium

MASSACHUSETTS DEPARTMENT OF EDUCATION

MASSACHUSETTS COMPREHENSIVE ASSESSMENT SYSTEM

Grade 10 Chemistry
Spring 2005 Released Items:
Standards and Correct Answers

Item No.	Page No.	Standard	Correct Answer (MC)*
1	291	1.1	C
2	291	4.7	C
3	292	7.1	A
4	292	5.1	B
5	293	3.3	C
6	294	9.3	C
7	294	8.1	B
8	295	1.1	
9	296	6.2	B
10	296	5.3	D
11	296	4.6	A
12	297	4.1	A
13	297	7.2	A
14	298	3.2	B
15	299	8.1	B
16	300	6.2	B
17	300	3.1	D
18	301	2.2	
19	302	6.1	D
20	302	5.1	C
21	303	7.2	C
22	303	5.2	C

* Answers are provided here for multiple-choice items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.

XIV. Introductory Physics, Grade 9/10

Grade 9/10 Introductory Physics Pilot Test

The spring 2005 Grade 9/10 MCAS Introductory Physics Test was based on learning standards in the Physics content strand of the Massachusetts *Science and Technology/Engineering Curriculum Framework* (2001). These learning standards appear on pages 68–70 of the *Framework*.

The *Science and Technology/Engineering Curriculum Framework* is available on the Department Web site at www.doe.mass.edu/frameworks/scitech/2001/0501.pdf.

Because the Grade 9/10 Introductory Physics Test was administered as a pilot test this year, the reporting of results is limited to *Test Item Analysis Reports*. No scaled score or performance level results are available.

Test Sessions and Content Overview

The MCAS Grade 9/10 Introductory Physics Test contained two separate test sessions. Each session included multiple-choice and open-response questions.

Reference Materials and Tools

Each student taking the Grade 9/10 Introductory Physics Test was provided with a *Physics Formula Sheet*. A copy of this reference sheet follows the final question in this chapter.

Each student also had sole access to a calculator with at least four functions and a square root key. No other reference tools or materials were allowed.

The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only, during both test sessions.

Cross-Reference Information

The table at the conclusion of this chapter indicates the *Framework* learning standard that each item assesses. The correct answers for multiple-choice questions are also displayed in the table.

Introductory Physics

SESSION 1

DIRECTIONS
This session contains ten multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet. You may work out solutions to multiple-choice questions in the test booklet.

1 The illustration below shows a 2-ton elephant balancing on a tree stump.
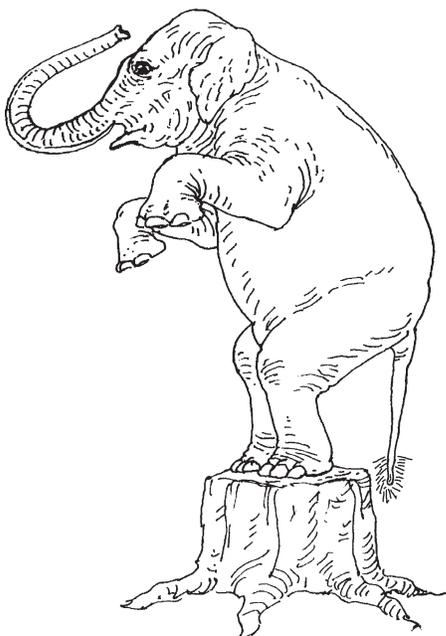
Which of the following statements must be accurate?

A. The weight of the tree stump is greater than 2 tons.

B. A 4-ton force on the ground spreads out in all directions.

C. The tree stump is exerting a 2-ton force upward on the elephant.

D. The downward force on the ground under the tree stump is 4 tons.

2 Which of the following describes how a microwave oven heats food?

A. The oven's interior reflects heat onto the food.

B. The oven's interior, like a lens, focuses heat onto the food.

C. Water molecules in the food reflect energy from microwave radiation.

D. Water molecules in the food absorb the energy of microwave radiation.

3 A recycling plant manager needs to melt 1500 kg of scrap copper to sell to a wire manufacturer. The copper is at 15°C and its melting point is 1083°C. The copper has a specific heat of 385 J/kg • K.

How much heat is required to raise the temperature of the copper to its melting point?

A. 6.2×10^8 J

B. 6.3×10^8 J

C. 7.7×10^8 J

D. 7.9×10^8 J

4 Each of the following illustrations shows the movement of a 1 kg object. Which of these is an example of simple harmonic motion?

A.

1 kg

falling freely

B.

1 kg swinging on a rope

C.

1 kg

rolling on a smooth surface

D.

sliding across a table

1 kg
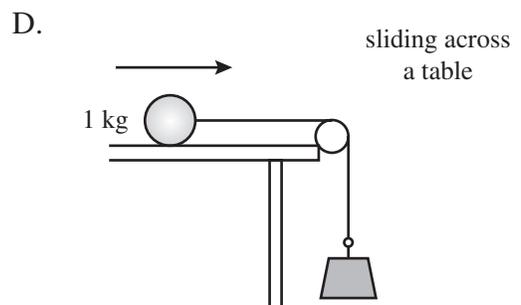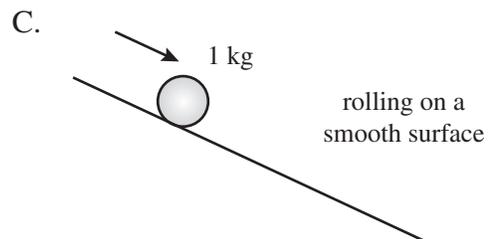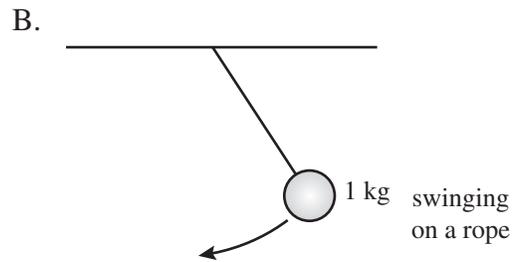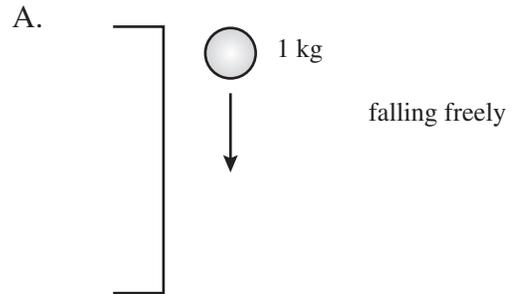
5 Which of the following describes an object that **must** have a net negative charge?

A. It contains more molecules than atoms.

B. It contains more electrons than protons.

C. It is carrying an electric current.

D. It is made of metal.

6 A 1500 kg car increases its speed by 2 m/s for each second of travel. What is the net force acting on the car?

A. 750 N

B. 1500 N

C. 3000 N

D. 6000 N

7 The illustration below represents an experiment in which a hot object is added to a container of water at room temperature.
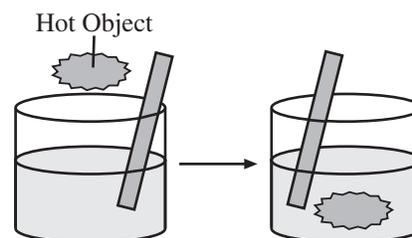
Hot Object

The water is continuously stirred while the hot object is immersed in it. Which of the following graphs best shows the temperature changes that follow?
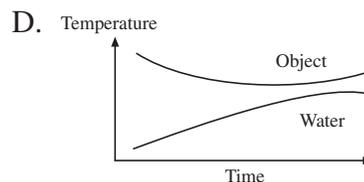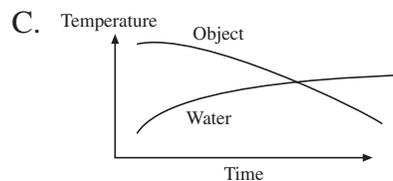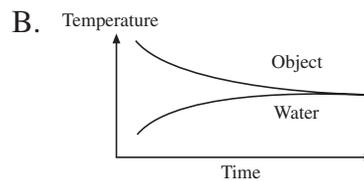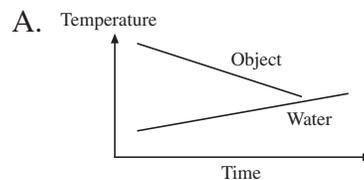
A.

B.

C.

D.

Question 8 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 8 in the space provided in your Student Answer Booklet.

8   The figure below shows a tennis ball bouncing from point 1 to point 5.
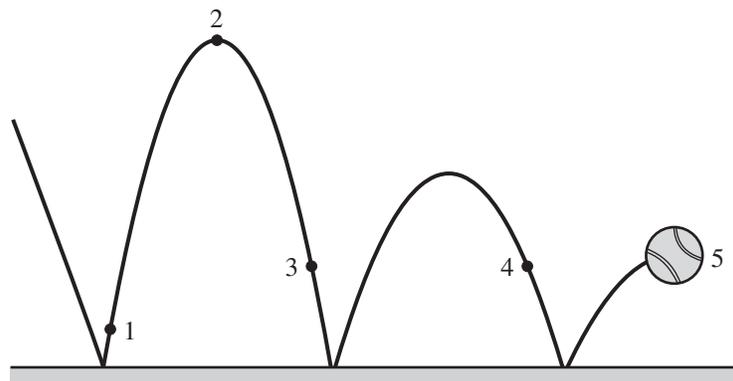
The tennis ball bounces up from point 1 as shown in the figure to a maximum height labeled as point 2. The ball then bounces a few times. Neglect any horizontal motion.

a. Describe the kinetic and gravitational potential energy changes of the ball that occur between points 1 and 2.

b. Describe the kinetic and gravitational potential energy changes of the ball that occur between points 2 and 3.

c. Compare the kinetic energy of the ball at points 3 and 4.

d. The tennis ball has less energy at point 5 than it had at point 3. Explain what happened to the energy the ball had at point 3.

Mark your answers to multiple-choice questions 9 through 11 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet, but you may work out solutions to multiple-choice questions in the test booklet.

9 An organ pipe produces a musical note with a wavelength of 2.72 m. What is the frequency of this note if the speed of sound is 348 m/s?

A. 85.7 Hz

B. 128 Hz

C. 260 Hz

D. 466 Hz

10 Students in a physics lab are studying the circuit shown in the diagram below.
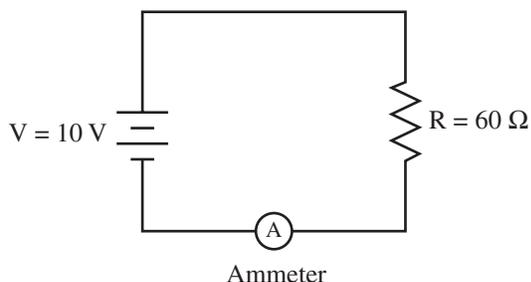
Ammeter

Which of the following options will double the current through the ammeter?

A. replacing the battery with a 5 V battery

B. adding a 30 Ω resistor in parallel with R

C. replacing the resistor with a 30 Ω resistor

D. adding a second 60 Ω resistor in series with R

11 Two boxes, A and B, both contain the same number of nitrogen gas molecules. The gas molecules in box A have twice the average speed of the molecules in box B. Which of the following **best** describes the nitrogen gas in box A?

A. The nitrogen gas in box A has a greater mass than the nitrogen gas in box B.

B. The nitrogen gas in box A has a greater density than the nitrogen gas in box B.

C. The nitrogen gas in box A has a greater temperature than the nitrogen gas in box B.

D. The nitrogen gas in box A has a greater specific gravity than the nitrogen gas in box B.

Introductory Physics

SESSION 2

DIRECTIONS
This session contains ten multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet. You may work out solutions to multiple-choice questions in the test booklet.

12 A hot air balloon exerts a force of 1200 N while lifting a load of 800 N. Which free-body force diagram depicts the forces involved?

A.   400 N

800 N

B.   800 N

1200 N

C.   1200 N

800 N

D.   800 N

400 N
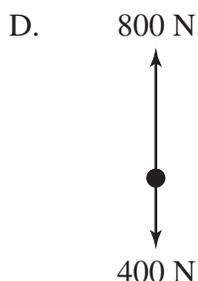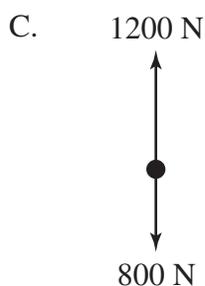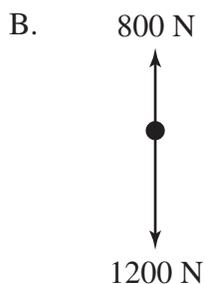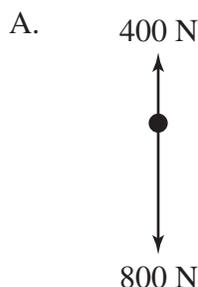
13 A 10 g sample of aluminum and a 10 g sample of iron were each heated by 100 joules of energy. The temperature of the aluminum sample rose 11°C, while the temperature of the iron sample increased 23°C. Which statement **best** accounts for these results?

A. Iron is twice as dense as aluminum.

B. Atoms of aluminum are smaller than atoms of iron.

C. Using equal masses results in similar heat capacities.

D. The specific heat of iron is less than that of aluminum.

14 The figure below shows regions of the electromagnetic spectrum.

Gamma
Radio   Microwaves   Infrared   Visible   Ultraviolet   X-rays   Rays

Which of the following waves has the highest frequency?

A. visible light

B. microwaves

C. ultraviolet rays

D. infrared radiation

15 A student combs her hair with a hard rubber comb and then hangs the comb on a loop of light thread that is suspended from a hook as shown below.
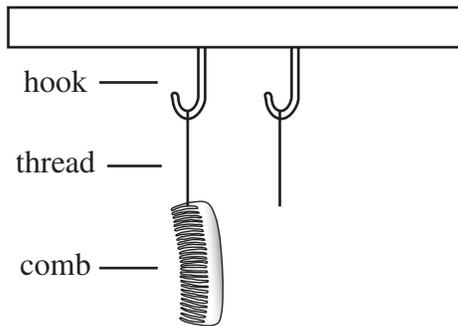
She immediately combs her hair with a second identical comb and hangs it on the second suspended loop of light thread. If the combing has caused a charge to accumulate on the combs, which of the following shows what will occur?

A.

B.

C.

D.
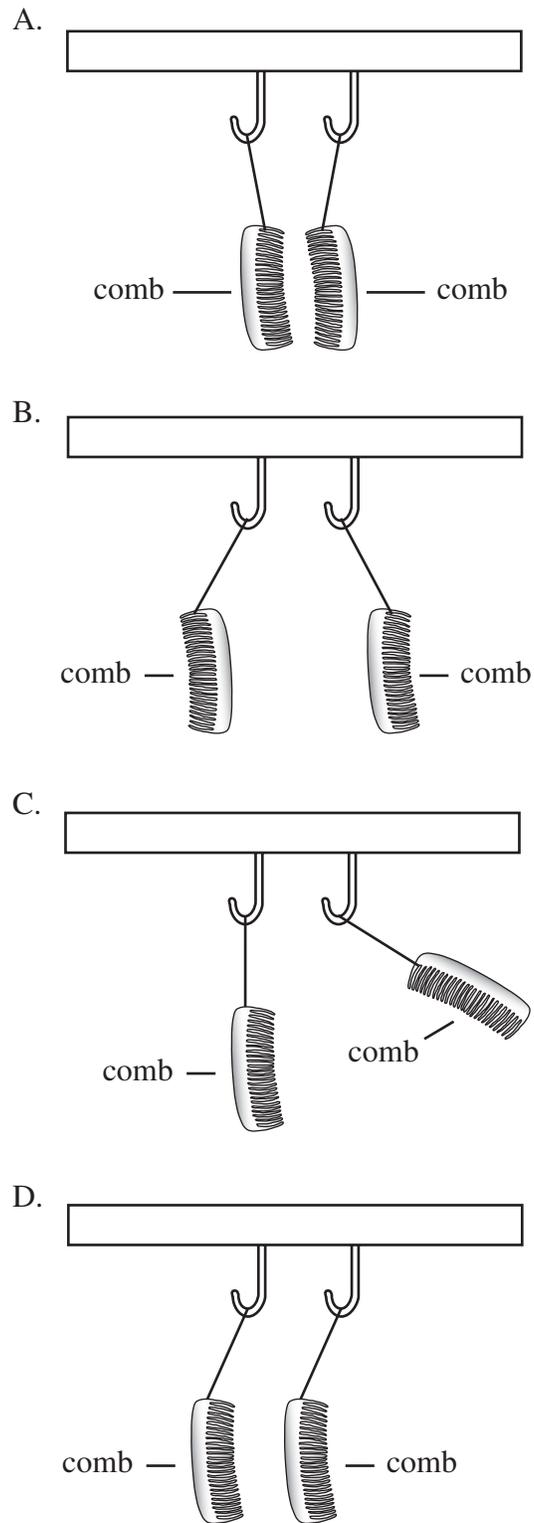
16 Which of the following **best** describes the relationship between frequency and wavelength of electromagnetic waves?

A. If the frequency remains constant, the wavelength increases.

B. The wavelength decreases as the frequency decreases.

C. The frequency increases as the wavelength decreases.

D. If the wavelength remains constant, the frequency increases.

17 Five bowling balls are lined up touching one another on a smooth surface. Striking the first ball with a hammer makes the fifth ball move away from the group. The force of the hammer was transmitted through the line of balls as what type of wave?

A. electromagnetic

B. heat

C. longitudinal

D. transverse

Question 18 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 18 in the space provided in your Student Answer Booklet.

18 The graphs below show movement over time.

Movement Over Time

Graph A

Movement Over Time
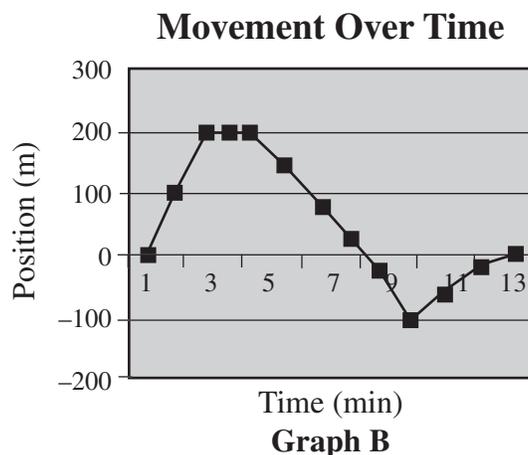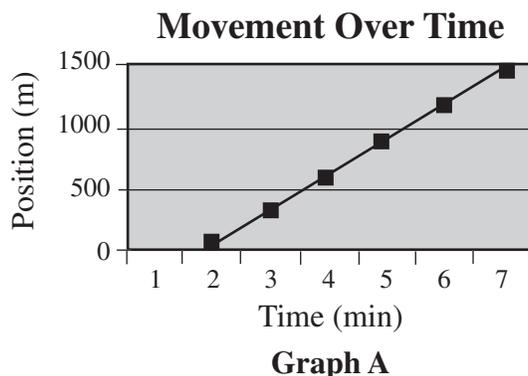
Graph B

A truck and car are on separate journeys on the same straight road. The truck is traveling at a constant velocity. The car changes speed and direction.

a. Which of the graphs **best** represents the truck's journey? Explain your answer.

b. Which of the graphs **best** represents the car's journey? Explain your answer.

Mark your answers to multiple-choice questions 19 through 22 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet, but you may work out solutions to multiple-choice questions in the test booklet.

19 A student is standing on a skateboard that is not moving. The total mass of the student and the skateboard is 50 kilograms. The student throws a ball with a mass of 2 kilograms forward at 5 m/s.

Assuming the skateboard wheels are frictionless, how will the student and the skateboard move?

A. forward at 0.4 m/s

B. forward at 5 m/s

C. backward at 0.2 m/s

D. backward at 5 m/s

20 Which of the following is a similarity between x-ray waves and sound waves?

A. Both transfer energy.

B. Both require a vacuum.

C. Both have the same speed.

D. Both have the same frequency.

21 A man ran on a treadmill for 1,800 seconds. At the end of his run, the treadmill indicated his energy output as 240,000 J. What average power did he generate?

A. 666 W

B. 133 W

C. 66 W

D. 7 W

22   Which of the following figures correctly shows the conduction of heat within the system of metal blocks?
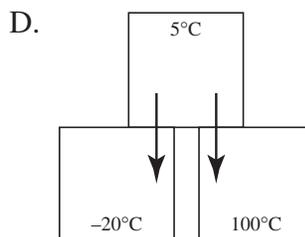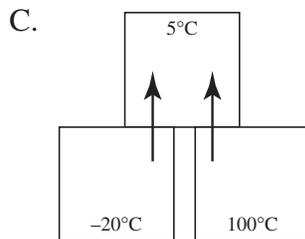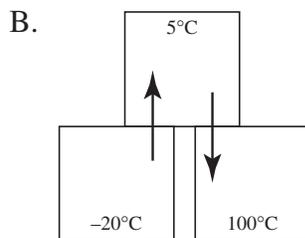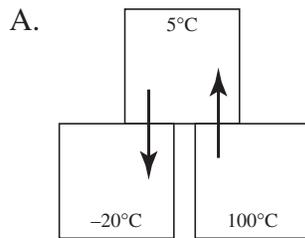
A.

5°C

−20°C   100°C

B.

5°C

−20°C   100°C

C.

5°C

−20°C   100°C

D.

5°C

−20°C   100°C

Formulas

$$\text{Average Speed} = \frac{\Delta d}{\Delta t}$$

$$F = G \frac{m_1 m_2}{d^2}$$

$$p = mv$$

$$\text{Average Acceleration:} = \frac{\Delta v}{\Delta t}$$

$$KE = \frac{1}{2}mv^2$$

$$V = IR$$

$$v_f = v_i + a\Delta t$$

$$PE = mg\Delta h$$

$$P = IV$$

$$\Delta d = v_i \Delta t + \frac{1}{2} a(\Delta t^2)$$

$$W = F\Delta d$$

$$Q = mc\Delta T$$

$$v_f^2 = v_i^2 + 2a\Delta d$$

$$P = \frac{W}{\Delta t}$$

$$v = f\lambda \text{ and } \lambda = \frac{c}{f}$$

$$F = ma$$

$$T = \frac{1}{f}$$

Variables

a = acceleration
c = specific heat
d = distance
Δd = change in distance
f = frequency
F = force
Δh = change in height
I = current
KE = kinetic energy
λ = wavelength
m = mass
p = momentum
P = power

PE = gravitational potential energy
Q = heat
R = resistance
Δt = change in time
ΔT = change in temperature
T = period
v = velocity
Δv = change in velocity
V = voltage
W = work
Subscripts:
  i = initial and f = final as subscripts

Definitions

G = Universal gravitational constant = $6.67 \times 10^{-11} \ \frac{N \cdot m^2}{kg^2}$

c = speed of electromagnetic waves = 3.00×10^8 m/s

g ≈ 10 m/s^2 1 N = $\frac{1 \ kg \cdot m}{s^2}$ 1 J = 1 N·m   1 W = $\frac{1 \ J}{s}$

Grade 9/10 Introductory Physics
Spring 2005 Released Items:
Standards and Correct Answers

Item No.	Page No.	Standard	Correct Answer (MC)*
1	309	1.10	C
2	309	6.2	D
3	310	3.3	A
4	310	4.1	B
5	311	5.1	B
6	311	1.7	C
7	311	3.3	B
8	312	2.1	
9	313	4.2	B
10	313	5.4	C
11	313	3.1	C
12	314	1.8	C
13	314	3.3	D
14	314	6.1	C
15	315	5.1	B
16	316	6.1	C
17	316	4.3	C
18	317	1.4	
19	318	2.5	C
20	318	4.4	A
21	318	2.4	B
22	319	3.1	A

* Answers are provided here for multiple-choice items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.

XV. Technology/Engineering, Grade 9/10

Grade 9/10 Technology/Engineering Pilot Test

The spring 2005 Grade 9/10 MCAS Technology/Engineering Test was based on learning standards in the Technology/Engineering content strand of the Massachusetts *Science and Technology/Engineering Curriculum Framework* (2001). These learning standards appear on pages 82–86 of the *Framework*.

The *Science and Technology/Engineering Curriculum Framework* is available on the Department Web site at www.doe.mass.edu/frameworks/scitech/2001/0501.pdf.

Because the Grade 9/10 Technology/Engineering Test was administered as a pilot test this year, the reporting of results is limited to *Test Item Analysis Reports*. No scaled score or performance level results are available.

Test Sessions and Content Overview

The MCAS Grade 9/10 Technology/Engineering Test included two separate test sessions. Each session included multiple-choice and open-response questions.

Reference Materials and Tools

Each student taking the Grade 9/10 Technology/Engineering Test was provided with a plastic ruler. An image of the ruler is not reproduced in this publication.

Each student also had sole access to a calculator with at least four functions and a square root key. No other reference tools or materials were allowed.

The use of bilingual word-to-word dictionaries was allowed for limited English proficient students only, during both test sessions.

Cross-Reference Information

The table at the conclusion of this chapter indicates the *Framework* learning standard that each item assesses. The correct answers for multiple-choice questions are also displayed in the table.

Technology/Engineering

SESSION 1

DIRECTIONS

This session contains ten multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet. You may work out solutions to multiple-choice questions in the test booklet.

1 The figure below shows a pictorial model of a highway bridge.
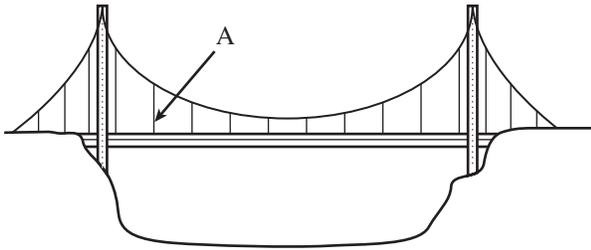
What is the primary structural action of member A?

A. compression

B. shear

C. tension

D. torsion

2 Foam weather stripping is often placed in the frames of doors and windows in a home. What is the purpose of this weather stripping?

A. The weather stripping increases heat transfer by radiation.

B. Heat is conducted quickly through the weather stripping.

C. The weather stripping reduces heat loss due to convection.

D. Heat can transfer through the weather stripping due to reflection.

3 Before concrete has hardened, it exhibits plasticity. This is an advantage because it allows the concrete to

A. become strong as it cures.

B. withstand compression.

C. remain pliable after hardening.

D. be molded into almost any shape.

4 Which of the following objects transfers its energy **primarily** by radiation?

A.

Heat lamp

B.

Electric stovetop

C.

Ceiling fan

D.

Burning candle
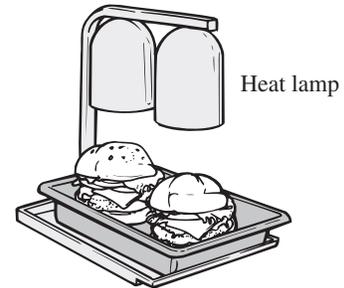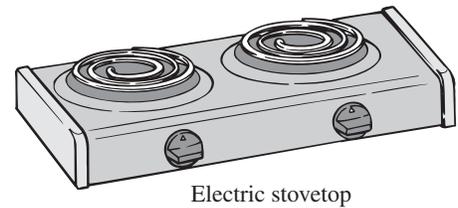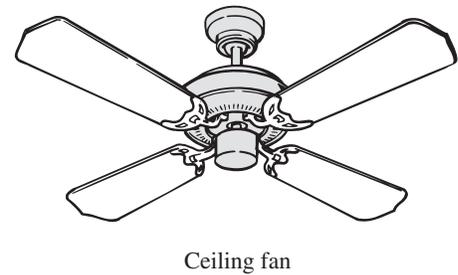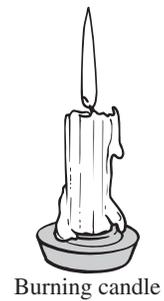
5 The diagram below shows a house and its floor plan.

Wind Direction
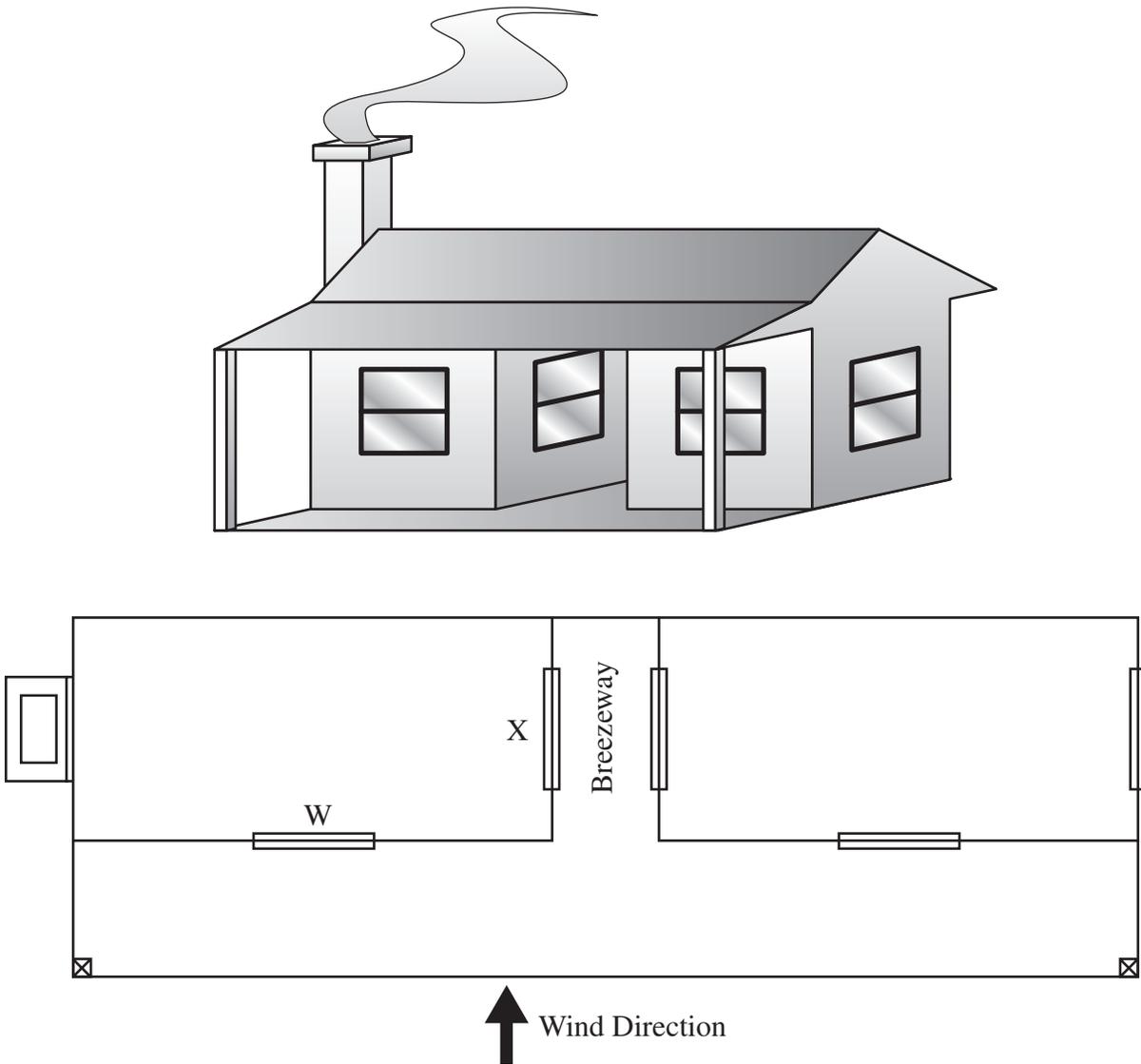
Settlers' homes in the Southwestern United States were often built with a porch facing the prevailing breeze and with two rooms separated by a breezeway. The funneling effects of the porch and front building walls could significantly accelerate the wind. Considering the effects of Bernoulli's principle, what air flow should be expected for windows X and W?

A. in W and out X

B. in W and in X

C. out W and in X

D. out W and out X

6   A scale drawing of a machined part is shown below.

Scale: 1 cm = 5 cm

X
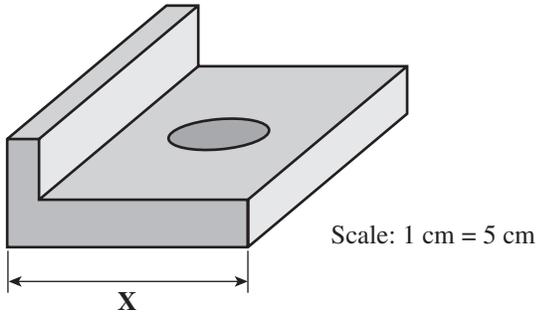
What would be the actual dimension X of this part when it is built?

A. 1.3 cm

B. 3.20 cm

C. 10.3 cm

D. 16.0 cm

7   The figure below shows a screwdriver that broke while being used as a pry bar.

What does the break indicate about the material in the shaft of the screwdriver?

A. It was too ductile.

B. It was too brittle.

C. It was too elastic.

D. It was too dense.

Question 8 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 8 in the space provided in your Student Answer Booklet.

8   Susan has installed a wireless doorbell for her apartment. When a person presses the button on the doorframe, it sets off an electronic buzzer inside the apartment.

   a. Explain how the terms "encoder" and "decoder" apply to this communications system.

   b. Describe how the system would fail if the encoder were broken.

   c. Describe how the system would fail if the decoder were broken.

Mark your answers to multiple-choice questions 9 through 11 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet, but you may work out solutions to multiple-choice questions in the test booklet.

9 One method of heat distribution is a baseboard forced hot water system. A baseboard system carries hot water through a pipe that passes through many small, flat plates called fins. What is the purpose of these fins?

A. to dissipate the heat of the hot water flowing through the pipe

B. to prevent the baseboard from coming in contact with hot surfaces

C. to replace the heated air leaving the system with cold air

D. to prevent dust and other particles from entering the baseboard

10 The diagram below shows a thin sheet of metal that has been rolled and fastened to make a cylinder.

Metal sheet

Metal cylinder
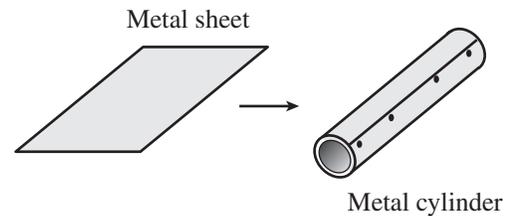
Which manufacturing process was used to create the cylinder?

A. conditioning

B. finishing

C. forming

D. molding

11 A circuit constructed on a circuit board is shown below.

Batteries
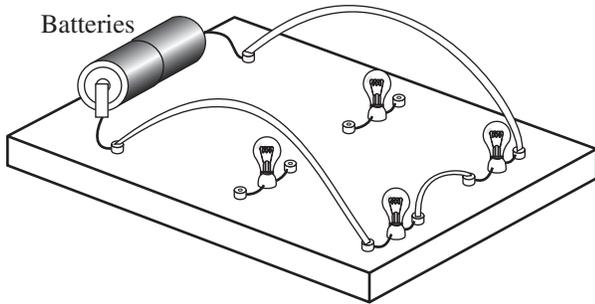
Which of the following schematic circuits correctly represents the circuit shown?
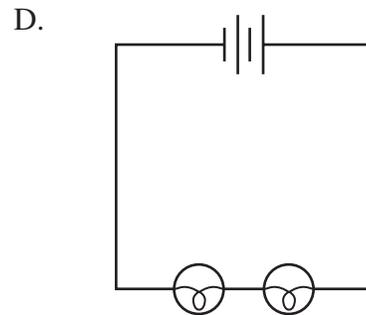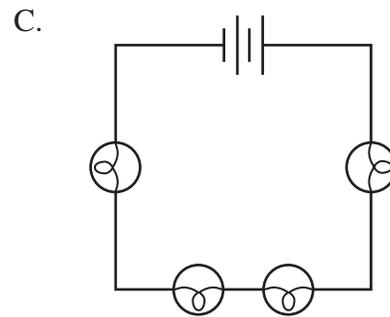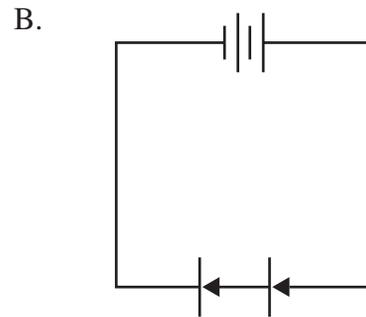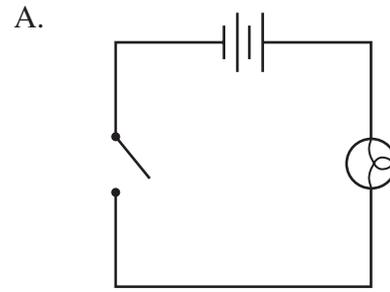
A.

B.

C.

D.

Technology/Engineering

SESSION 2

DIRECTIONS

This session contains ten multiple-choice questions and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet. You may work out solutions to multiple-choice questions in the test booklet.

12 The diagram below shows a cantilever beam with a force (P) applied.
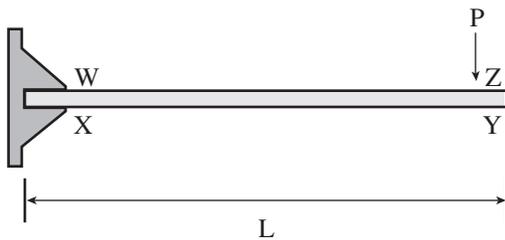
For the cantilever beam shown, where is the maximum tensile stress when force P is applied?

A. W

B. X

C. Y

D. Z

13 Several electrical components are drawn below.
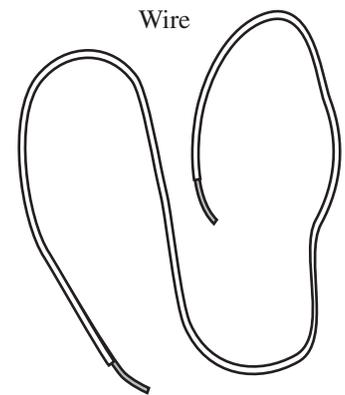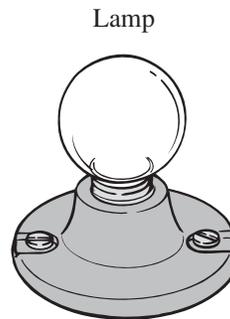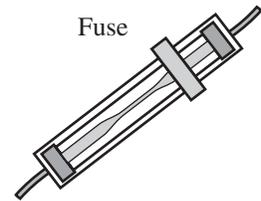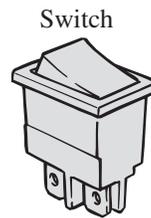
Which of the following is needed to make an electrical circuit using these components?

A. load

B. resistor

C. source

D. transistor

14 The picture below shows a microwave oven.

Convection
Microwave Oven
0.8 cu. ft.
900 W
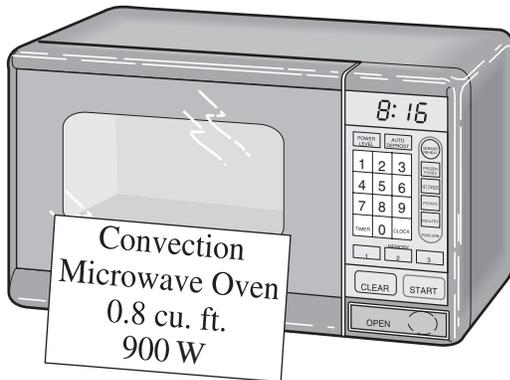
This microwave is labeled "Convection Microwave Oven." According to this label, what is one way heat is transferred in this oven?

A. by the movement of air inside the oven

B. by standing waves in air outside the oven

C. by electrostatic charges on atoms in the food

D. by direct contact between the oven and the food

**15** The diagram below shows a machine used in a factory.
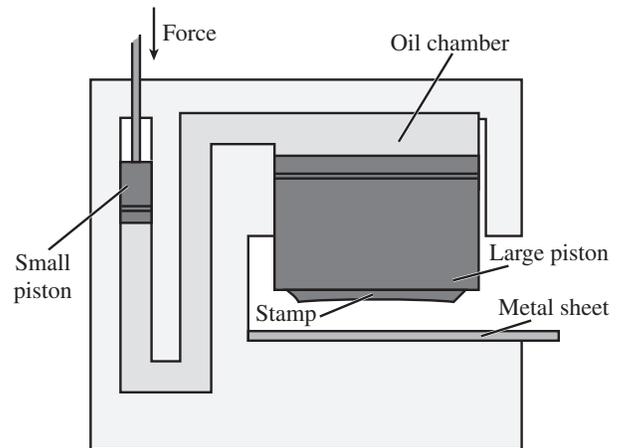
In this machine, fluid pressure is used to stamp sheets of metal with a large piston. Which type of system is illustrated?

A. hydraulic lift

B. hydraulic press

C. pneumatic lift

D. pneumatic press

16 The drawing below shows a block with a groove along one side.
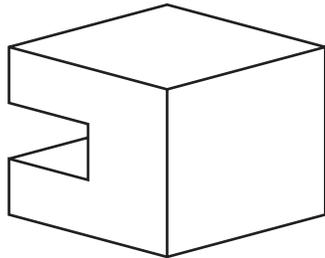
Which of the following sets of views could be the front and right-side views of this block?

A.
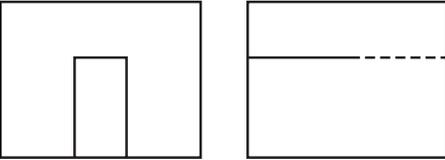
B.
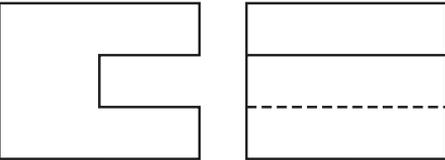
C.
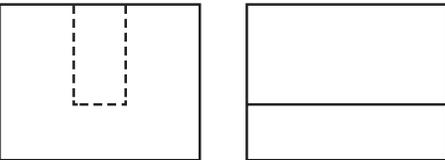
D.
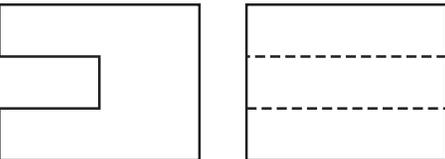
17 The diagram below shows a circuit.
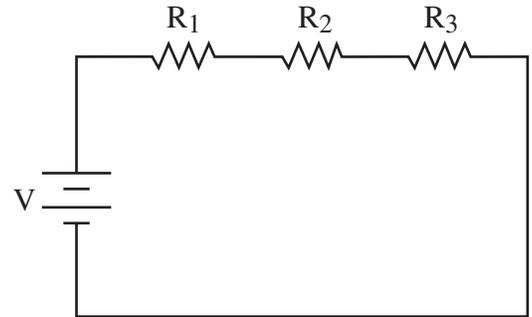
Ohm's Law
$V = IR$
$I = \dfrac{V}{R}$
$R = \dfrac{V}{I}$

The current in this circuit is 3 A. The resistance of R_1 is 2 Ω. R_2 and R_3 each have a resistance of 4 Ω. What is the voltage for this circuit?

A. 6 V

B. 10 V

C. 30 V

D. 90 V

Question 18 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

**Write your answer to question 18 in the space provided in your Student Answer Booklet.**

18 A group of students is doing a semester project to determine the best material for textbook covers. During the project, they will conduct a one-month pilot study in which a class of students will try out different types of textbook covers.

a. Identify **one** step in the engineering design process that the students should do before starting the pilot study.

b. Explain in detail **one** step that the students should do after the pilot study.

c. Explain in detail why **both** of these steps are important.

Mark your answers to multiple-choice questions 19 through 22 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet, but you may work out solutions to multiple-choice questions in the test booklet.

19 Which of the following is the primary way that evergreen trees planted on the north and west sides of residences in Massachusetts help reduce winter heating costs?

A. They insulate against cold air.

B. They optimize solar heating.

C. They reduce radiant cooling.

D. They act as a windbreak.

20 The diagram below shows a circuit.
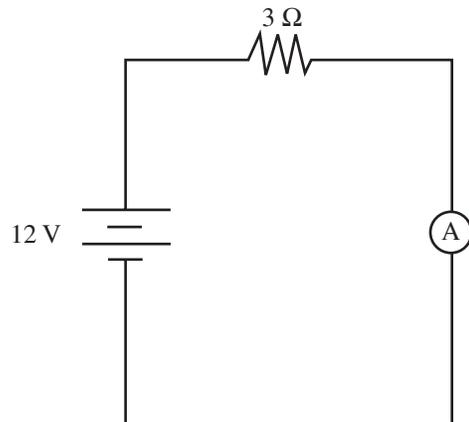
Ohm's Law
$V = IR$
$I = \dfrac{V}{R}$
$R = \dfrac{V}{I}$

If the resistance in this circuit is 3 Ω and the voltage is 12 V, what is the expected current in this circuit?

A. 4 A

B. 9 A

C. 15 A

D. 36 A

21 The drawing below shows a ratchet, which is a mechanical device.
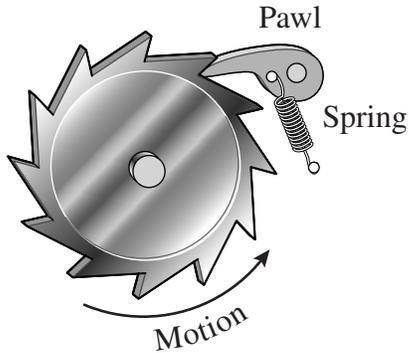
Which of the following is the correct interpretation of this drawing?

A. It shows the size of the finished device.

B. It shows how a ratchet can be manufactured.

C. It shows the operation of a ratchet mechanism.

D. It shows the necessary materials for the device.

22 The figure below shows a snow-covered greenhouse.
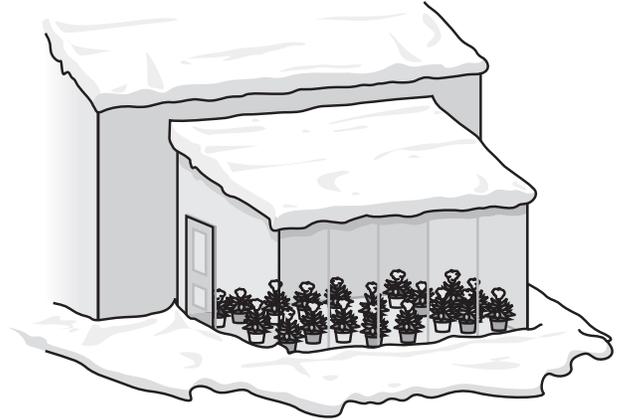
The snow on the greenhouse has a density of 100 kg/m^3 and is 0.1 m deep. The roof is 5 m wide and 8 m long. What is the load of snow on the roof?

A. 40 kg

B. 400 kg

C. 4,000 kg

D. 40,000 kg

Grade 9/10 Technology/Engineering
Spring 2005 Released Items:
Standards and Correct Answers

Item No.	Page No.	Standard	Correct Answer (MC)*
1	324	2.1	C
2	324	4.2	C
3	325	7.1	D
4	325	4.1	A
5	326	3.3	A
6	327	1.4	D
7	327	2.4	B
8	328	6.4	
9	329	4.2	A
10	329	7.1	C
11	330	5.2	D
12	331	2.1	A
13	331	5.2	C
14	332	4.1	A
15	332	3.4	B
16	333	1.2	D
17	333	5.4	C
18	334	1.1	
19	335	4.4	D
20	335	5.3	A
21	336	1.5	C
22	336	2.6	B

* Answers are provided here for multiple-choice items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.