XI. Mathematics, Grade 5

Grade 5 Mathematics Test

The spring 2014 grade 5 Mathematics test was based on standards in the five major domains for grade 5 in the *Massachusetts Curriculum Framework for Mathematics* (March 2011). The grade 5 standards can be found on pages 48–52 in the *Framework*, and the five major domains are listed below.

- Operations and Algebraic Thinking
- Number and Operations in Base Ten
- Number and Operations—Fractions
- Measurement and Data
- Geometry

The *Massachusetts Curriculum Framework for Mathematics* is available on the Department website at www.doe.mass.edu/frameworks/current.html.

Mathematics test results are reported under five MCAS reporting categories, which are identical to the five framework domains listed above.

The tables at the conclusion of this chapter indicate each released and unreleased common item's reporting category and the framework standard it assesses. The correct answers for released multiple-choice and short-answer questions are also displayed in the released item table.

Test Sessions

The grade 5 Mathematics test included two separate test sessions. Each session included multiple-choice, short-answer, and open-response questions. Approximately half of the common test items are shown on the following pages as they appeared in test booklets.

Reference Materials and Tools

Each student taking the grade 5 Mathematics test was provided with a plastic ruler and a grade 5 Mathematics Reference Sheet. A copy of the reference sheet follows the final question in this chapter. An image of the ruler is not reproduced in this publication.

The use of bilingual word-to-word dictionaries was allowed for current and former English language learner students only, during both Mathematics test sessions. No calculators, other reference tools, or materials were allowed.

Grade 5 Mathematics

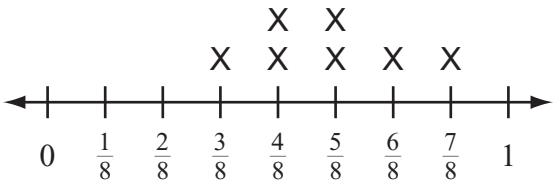
Session 1

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 eight multiple-choice questions, one short-answer question, and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

1 Linda's cat had seven kittens. Linda weighed the kittens when they were three weeks old. She recorded the kittens' weights to the nearest one-eighth pound on a line plot, as shown below.



Weight (pounds)

What was the total weight of all of Linda's kittens when they were three weeks old?

A. $2\frac{6}{8}$ pounds

B. $3\frac{1}{8}$ pounds

C. $4\frac{2}{8}$ pounds

D. $4\frac{4}{8}$ pounds

2 The floor of Juan's storage unit is in the shape of a rectangle with a length of 10 feet and a width of 8 feet. The height of the storage unit is 9 feet.

What is the volume of the storage unit?

A. 242 cubic feet

B. 360 cubic feet

C. 484 cubic feet

D. 720 cubic feet

3 Which of the following correctly describes a way to move from the origin on a coordinate grid to the point (2, 5)?

A. 5 units right and 2 units up

B. 2 units right and 5 units up

C. 5 units left and 2 units down

D. 2 units left and 5 units down

4 A group of 4 friends are sharing a package of 7 chocolate bars. If the package is divided equally among the friends, how much chocolate should each friend get?

A. $7\frac{1}{4}$ bars

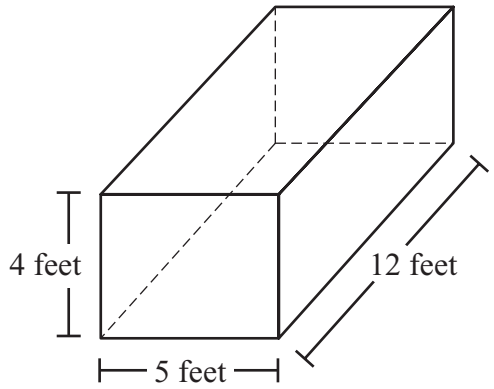
B. $4\frac{1}{3}$ bars

C. $3\frac{1}{2}$ bars

D. $1\frac{3}{4}$ bars

Question 5 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.

5 The dimensions of a rectangular prism are shown below.



What is the volume, in cubic feet, of the rectangular prism?

Mark your answers to multiple-choice questions 6 through 9 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.

6 Which of the following is equivalent to 4.063?

A. $4 + 0.6 + 0.3$

B. $4 + 0.6 + 0.03$

C. $4 + 0.06 + 0.03$

D. $4 + 0.06 + 0.003$

7 Kylie is decorating cards with ribbon. She uses 25 centimeters of ribbon on each card.

Kylie has 1 meter of ribbon. What is the total number of cards Kylie can decorate?

A. 4

B. 5

C. 100

D. 250

8 Which of the following is equivalent to the expression below?

$$5 \times (42 \div 6)$$

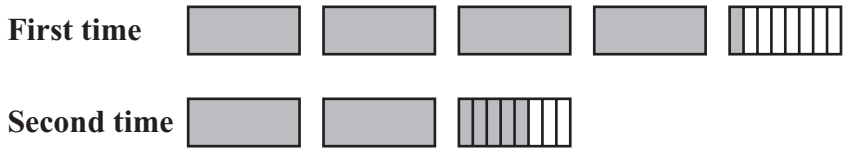
A. 5 times 42 groups of 6

B. 5 more than 42 divided by 6

C. 5 times as large as 42 divided by 6

D. 5 groups of 42 divided by 5 groups of 6

9 Jodi measured the length of an icicle two times. The first time Jodi measured the icicle, it was $4\frac{1}{8}$ inches long. The second time Jodi measured the icicle, it had partly melted and was $2\frac{5}{8}$ inches long. The diagram below models the length of the icicle, in inches, each time Jodi measured it.



How many inches shorter was the icicle the second time Jodi measured it compared to the first time she measured it?

A. $1\frac{1}{4}$ inches

B. $1\frac{1}{2}$ inches

C. $2\frac{3}{8}$ inches

D. $2\frac{1}{2}$ inches

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 Molly buys 2 packs of 10 baseball cards every week. She gives her little brother 3 cards from each pack and saves the rest. The expression below shows how many cards Molly will save after 5 weeks.

$$5 \times [(2 \times 10) - (2 \times 3)]$$

a. What is the total number of baseball cards Molly will save after 5 weeks? Show or explain how you got your answer.

Hugo buys 15 stickers every week for 10 weeks. Each week he uses 6 stickers and saves the rest.

b. Write an expression to show the total number of stickers Hugo will save after 10 weeks.

Kaitlin buys 20 stickers every week for 10 weeks. Each week she uses 5 stickers and saves the rest.

c. What is the total number of stickers Hugo **and** Kaitlin will save after 10 weeks? Show or explain how you got your answer.

Grade 5 Mathematics

Session 2

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 eight multiple-choice questions, two short-answer questions, and one open-response question. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

11 Which of the following equations is true?

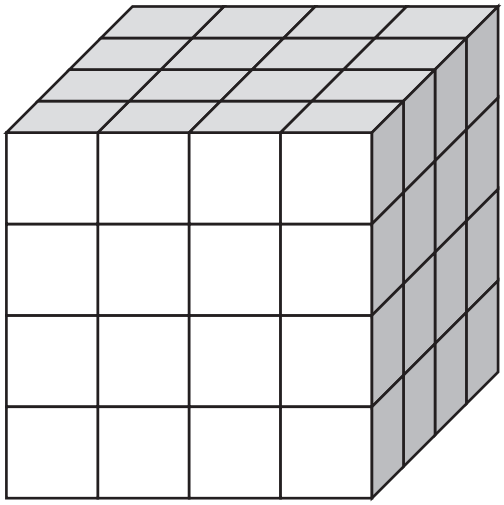
A. $10^3 = 3 \times 10$

B. $10^3 = 3 \times 10 + 10$

C. $10^3 = 10 \times 10 \times 10$

D. $10^3 = 10 + 10 + 10$

12 Jake built a cube out of 1-centimeter blocks, as shown below.



What is the volume of the cube?

A. 12 cubic centimeters

B. 16 cubic centimeters

C. 48 cubic centimeters

D. 64 cubic centimeters

13 Carlos cuts $\frac{1}{2}$ yard of ribbon into 3 equal pieces. What is the length of each piece of ribbon?

A. $\frac{1}{6}$ yard

B. $\frac{1}{3}$ yard

C. $\frac{3}{2}$ yards

D. 3 yards

14 Which of the following statements is true about every isosceles right triangle?

A. It has three acute angles.
B. It has no obtuse angles.
C. It has three equal sides.
D. It has no equal sides.

15 Serena has 6 pieces of fabric. Each piece is $\frac{5}{8}$ yard long. What is the total length, in yards, of Serena's pieces of fabric?

A. 3

B. $3\frac{3}{4}$

C. $4\frac{1}{4}$

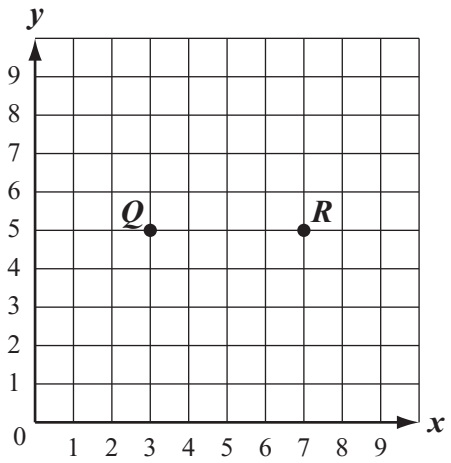
D. 8

Questions 16 and 17 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.

16 Compute:

$$\frac{2}{5} + \frac{3}{10}$$

17 Jillian plotted points Q and R on a coordinate grid, as shown below.



Jillian wants to plot point S so that when points Q, R, and S are connected they form the vertices of a right triangle. Write an ordered pair that represents where Jillian should plot point S.

Mark your answers to multiple-choice questions 18 through 20 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.

18 What is 26.387 rounded to the nearest **tenth**?

A. 30.0

B. 26.4

C. 26.39

D. 26.30

19 Sue needs to practice clarinet for 10 hours this week.

- On the first day of this week, she practiced for $1\frac{1}{2}$ hours.
- On the second day of this week, she practiced for $1\frac{1}{4}$ hours.

How many **more** hours does Sue need to practice this week?

A. $7\frac{1}{4}$

B. $7\frac{4}{6}$

C. $8\frac{2}{6}$

D. $8\frac{3}{4}$

20 Manny's gingerbread cookie recipe uses $6\frac{1}{2}$ cups of flour. Manny wants to make $\frac{1}{2}$ the recipe.

What is the total number of cups of flour Manny will need to make $\frac{1}{2}$ the recipe?

A. $3\frac{1}{4}$

B. $3\frac{1}{2}$

C. 6

D. 7

Question 21 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 21 in the space provided in your Student Answer Booklet.

21 A class of 25 students is going on a field trip. The bus for the field trip will cost a total of $125. Each student will pay the same amount for the bus.

a. What is the cost of the bus for each student? Show your work or explain how you got your answer.

On the field trip, students can purchase a lunch for $2.75, a bottle of water for $0.69, a snack for $1.25, and a T-shirt for $12.50.

b. What is the total cost of one lunch, one bottle of water, one snack, and one T-shirt? Show your work or explain how you got your answer.

Harold is going on the field trip. He wants to buy a snack and a T-shirt. Harold has a total of $13.10.

c. Does Harold have enough money to buy the snack and the T-shirt? Show your work or explain how you got your answer.

PERIMETER (P) FORMULAS

perimeter = distance around

square . . . . . $P = 4 \times s$
(s = length of a side)

rectangle . . . . . $P = (2 \times l) + (2 \times w)$
(l = length; w = width)

triangle . . . . . $P = a + b + c$
(a, b, and c are the lengths of the sides)

VOLUME (V) FORMULAS

rectangular prism . . . . . $V = l \times w \times h$
(l = length; w = width; h = height)

cube . . . . . $V = s \times s \times s$
(s = length of an edge)

AREA (A) FORMULAS

square . . . . . $A = s \times s$
(s = length of a side)

rectangle . . . . . $A = l \times w$
(l = length; w = width)

triangle . . . . . $A = \frac{1}{2} \times b \times h$
(b = length of the base;
h = height)

Grade 5 Mathematics
Spring 2014 Released Items:
Reporting Categories, Standards, and Correct Answers*

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC/SA)*
1	170	*Measurement and Data*	MD.2	C
2	170	*Measurement and Data*	MD.5	D
3	171	*Geometry*	G.1	B
4	171	*Number and Operations-Fractions*	NF.3	D
5	172	*Measurement and Data*	MD.5	240 cubic feet
6	173	*Number and Operations in Base Ten*	NBT.3	D
7	173	*Measurement and Data*	MD.1	A
8	173	*Operations and Algebraic Thinking*	OA.2	C
9	174	*Number and Operations-Fractions*	NF.2	B
10	175	*Operations and Algebraic Thinking*	OA.1	
11	176	*Number and Operations in Base Ten*	NBT.2	C
12	176	*Measurement and Data*	MD.4	D
13	177	*Number and Operations-Fractions*	NF.7	A
14	177	*Geometry*	G.4	B
15	177	*Number and Operations-Fractions*	NF.4	B
16	178	*Number and Operations-Fractions*	NF.1	7/10
17	178	*Geometry*	G.2	Any point that forms the third vertex of a right triangle
18	179	*Number and Operations in Base Ten*	NBT.4	B
19	179	*Number and Operations-Fractions*	NF.1	A
20	179	*Number and Operations-Fractions*	NF.6	A
21	180	*Number and Operations in Base Ten*	NBT.7	

***** 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 the shaded cells, will be posted to the Department's website later this year.

Grade 5 Mathematics
Spring 2014 Unreleased Common Items:
Reporting Categories and Standards

Item No.	Reporting Category	Standard
22	*Number and Operations in Base Ten*	NBT.1
23	*Operations and Algebraic Thinking*	OA.1
24	*Number and Operations in Base Ten*	NBT.7
25	*Number and Operations in Base Ten*	NBT.1
26	*Number and Operations in Base Ten*	NBT.7
27	*Number and Operations in Base Ten*	NBT.5
28	*Measurement and Data*	MD.1
29	*Number and Operations-Fractions*	NF.2
30	*Number and Operations-Fractions*	NF.3
31	*Number and Operations in Base Ten*	NBT.6
32	*Operations and Algebraic Thinking*	OA.3
33	*Operations and Algebraic Thinking*	OA.3
34	*Number and Operations in Base Ten*	NBT.5
35	*Measurement and Data*	MD.2
36	*Number and Operations in Base Ten*	NBT.1
37	*Operations and Algebraic Thinking*	OA.2
38	*Operations and Algebraic Thinking*	OA.1
39	*Number and Operations-Fractions*	NF.1
40	*Geometry*	G.4
41	*Measurement and Data*	MD.1
42	*Geometry*	G.2