
IX. Mathematics, Grade 3

Grade 3 Mathematics Test

The spring 2013 grade 3 Mathematics test was based on standards in the five domains for grade 3 in the Massachusetts *Curriculum Framework for Mathematics* (March 2011). The grade 3 standards can be found on pages 38–42 in the *Framework*, and the five domains are listed below.

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

The *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.

Test Sessions

The grade 3 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 grade 3 test & answer booklets.

Reference Materials and Tools

Each student taking the grade 3 Mathematics test was provided with a plastic ruler and a grade 3 Mathematics Tool Kit. A copy of the tool kit pieces used by students to answer question 17 immediately follows the last 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.

Cross-Reference Information

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.

Grade 3 Mathematics

SESSION 1

You may use your tool kit and MCAS ruler during this session.

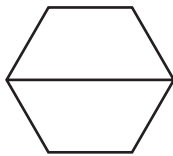
You may **not** use a calculator during this session.



DIRECTIONS

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

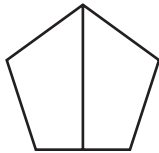
- 1 Hugo divided shapes into equal parts, as shown below.



Shape A



Shape B



Shape C



Shape D

In which shape is each part equal to $\frac{1}{6}$ the area of the whole shape?

- (A) Shape A
- (B) Shape B
- (C) Shape C
- (D) Shape D

- 2 A division fact is shown in the box below.

$$72 \div 8 = n$$

Which of these shows a related fact?

- (A) $8 \times n = 72$
- (B) $8 + n = 72$
- (C) $72 \times 8 = n$
- (D) $72 + 8 = n$

Question 3 is a short-answer question. Write your answer to this question in the Answer Box provided.

3 Compute:

$$134 - 78$$

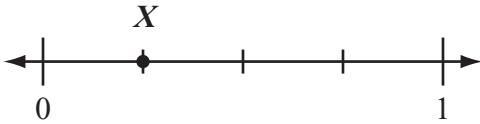
Write your answer in the Answer Box below.

Answer Box

3

Mark your choice for multiple-choice questions 4 through 7 filling in the circle next to the best answer.

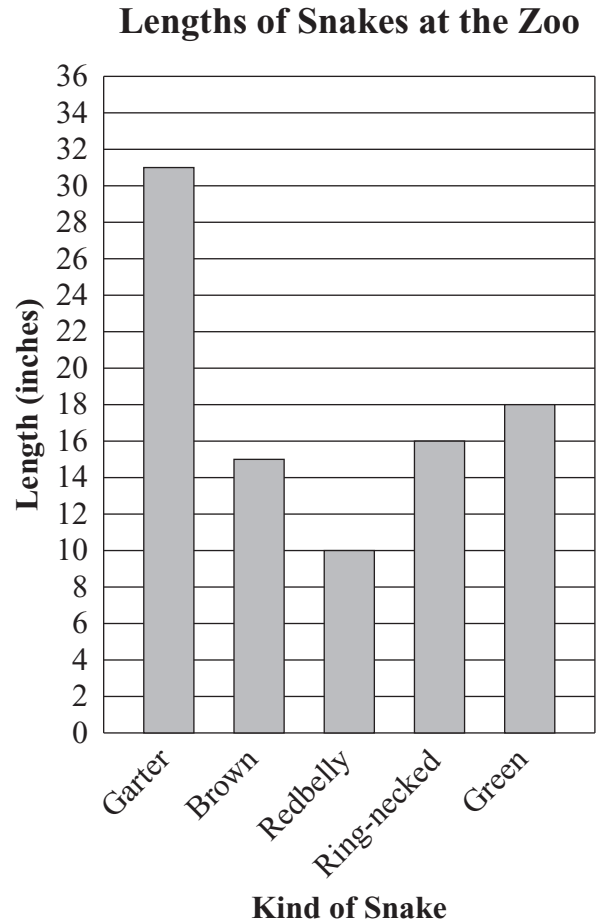
- 4 Nina put point X on a number line, as shown below.



Which fraction best shows where Nina put point X ?

- (A) $\frac{1}{1}$
- (B) $\frac{1}{2}$
- (C) $\frac{1}{4}$
- (D) $\frac{1}{5}$

- 5 The lengths of five snakes at a zoo are shown in the graph below.



Which two snakes together have the same length as the garter snake?

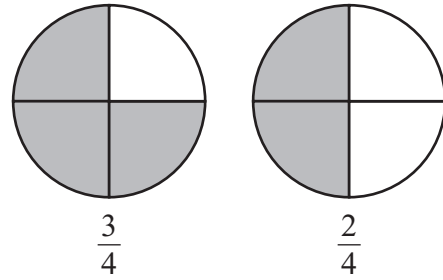
- (A) redbelly snake and brown snake
- (B) redbelly snake and green snake
- (C) brown snake and green snake
- (D) brown snake and ring-necked snake

- 6 On the first day of their trip, the Knox family drove 368 miles. On the second day, they drove 447 miles.

How many miles did the Knox family drive on the two days?

- (A) 705
- (B) 715
- (C) 805
- (D) 815

- 7 Ethan shaded the parts of the circles shown below.



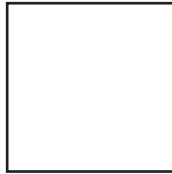
Which of these is true?

- (A) $\frac{2}{4} = \frac{3}{4}$
- (B) $\frac{2}{4} > \frac{3}{4}$
- (C) $\frac{3}{4} > \frac{2}{4}$
- (D) $\frac{3}{4} < \frac{2}{4}$

Write your answers to parts (a) and (b) of open-response question 8 in the spaces provided.

You may use your MCAS ruler to answer question 8.

- 8 Mario drew a square, as shown below.



- a. Draw a shape that is **not** a square but has 4 sides and 4 right angles.
Label your shape with its mathematical name.

- b. Draw a shape that has 4 sides but has **no** right angles.
Label your shape with its mathematical name.

Grade 3 Mathematics

SESSION 2

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 seven multiple-choice questions, two short-answer 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 short-answer and open-response questions, write your answer in the space provided.

- 9 Ms. Gonzales put 24 desks into groups. Each group had 4 desks.

Which number sentence can be used to find how many groups of desks Ms. Gonzales made?

- (A) $\square \div 4 = 24$
- (B) $\square - 4 = 24$
- (C) $24 \div 4 = \square$
- (D) $24 - 4 = \square$

- 10 What is 678 rounded to the nearest **hundred**?

- (A) 600
- (B) 670
- (C) 680
- (D) 700

- 11 Four students each wrote an estimate for the sum below.

$$12 + 37 + 9 = \square$$

The students' estimates are shown in the chart below.

Student	Estimate
Arden	$20 + 40 + 10$
Beth	$10 + 40 + 10$
Chris	$10 + 30 + 10$
Dave	$10 + 30 + 5$

Which student had the estimate closest to the sum?

- (A) Arden
- (B) Beth
- (C) Chris
- (D) Dave

Question 12 is a short-answer question. Write your answer to this question in the Answer Box provided.

- 12** Students are filling bags with popcorn. It takes 5 scoops of popcorn to fill a total of 4 bags. The chart below shows how many scoops of popcorn are needed to fill different numbers of bags.

Popcorn Bags

Scoops of Popcorn	5	10	15	20	25	30
Number of Bags	4	8	12	16	20	?

How many bags can be filled with 30 scoops of popcorn? Write your answer in the Answer Box below.

Answer Box

12

Question 13 is a short-answer question. Write your answer to this question in the Answer Box provided.

Use your MCAS ruler to answer question 13.

- 13 What is the length, to the nearest $\frac{1}{4}$ inch, of the line segment below?



Write your answer in the Answer Box below.

Answer Box

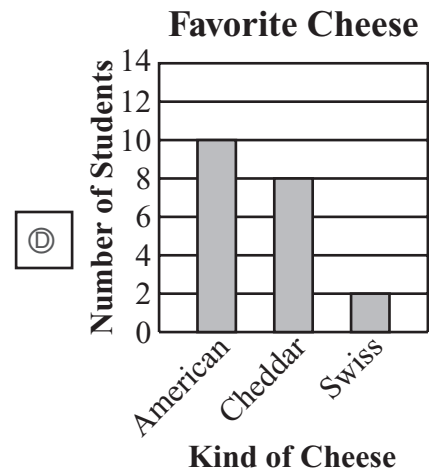
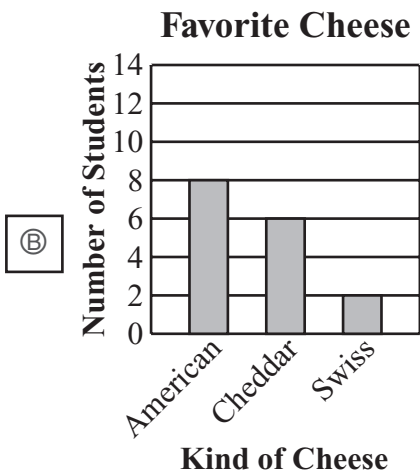
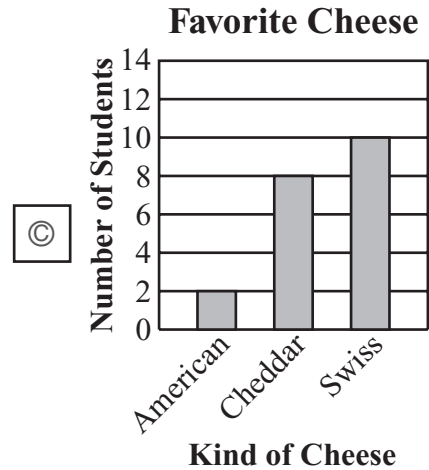
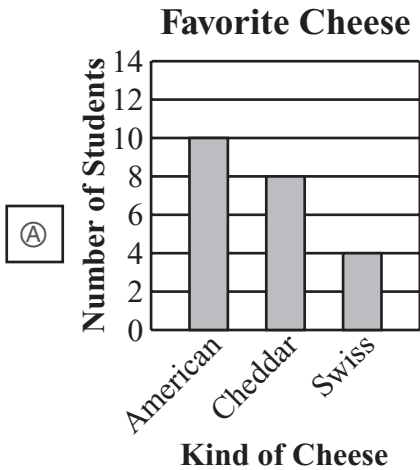
13

Mark your choices for multiple-choice questions 14 through 17 by filling in the circle next to the best answer.

14 A school cook asked 20 students to name a favorite kind of cheese. The data she collected is shown below.

- 10 students said American cheese.
- 8 students said cheddar cheese.
- 2 students said Swiss cheese.

Which bar graph correctly shows the cook’s data?

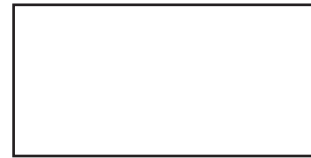


15 Which of these could be the mass of an adult horse?

- (A) 500 liters
- (B) 500 grams
- (C) 500 milliliters
- (D) 500 kilograms

Use your MCAS ruler to answer question 16.

16 Peter drew the rectangle shown below.

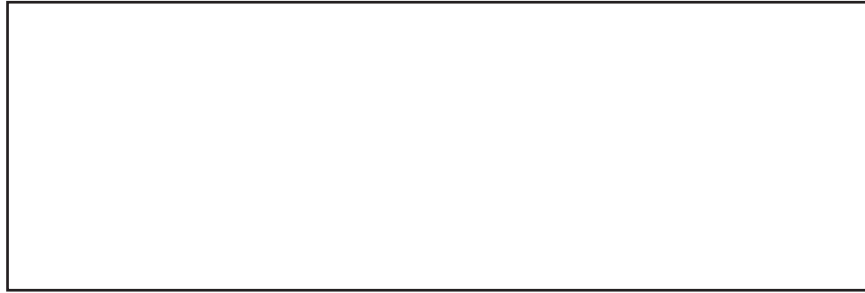


What is the area, in square centimeters, of Peter's rectangle?

- (A) 6 square centimeters
- (B) 8 square centimeters
- (C) 12 square centimeters
- (D) 16 square centimeters

Use the shapes labeled Z from your tool kit to answer question 17.

- 17 Greta has the rectangle shown below.



Greta wants to completely cover her rectangle with the shapes labeled Z without any overlapping.

How many shapes labeled Z are needed to completely cover Greta’s rectangle?

- (A) 3
- (B) 4
- (C) 6
- (D) 7

Write your answers to parts (a) and (b) of open-response question 18 in the spaces provided.

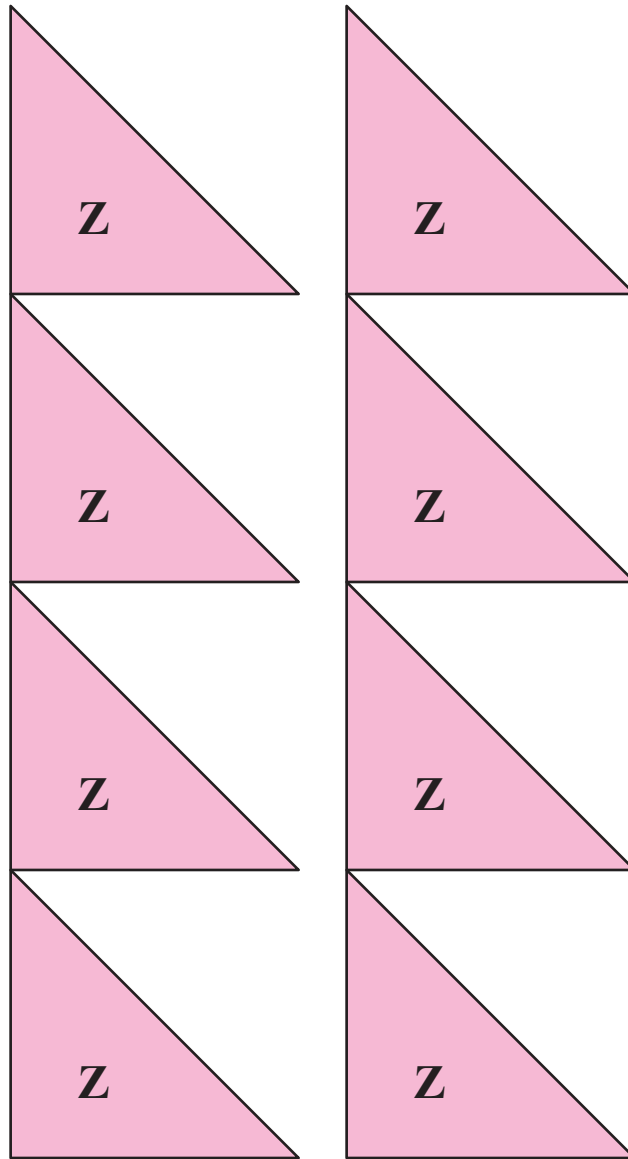
- 18** Tony made a number pattern, as shown below.

65, 60, 55, 50, ...

- a. What could be the rule for Tony's pattern?

- b. Use the rule for Tony's pattern to complete a new number pattern below.

_____, 101, 96, _____



Grade 3 Mathematics
Spring 2013 Released Items:
Reporting Categories, Standards, and Correct Answers*

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC/SA)*
1	150	<i>Number and Operations—Fractions</i>	NF.1	B
2	150	<i>Operations and Algebraic Thinking</i>	OA.6	A
3	151	<i>Number and Operations in Base Ten</i>	NBT.2	56
4	152	<i>Number and Operations—Fractions</i>	NF.2	C
5	152	<i>Measurement and Data</i>	MD.3	D
6	153	<i>Number and Operations in Base Ten</i>	NBT.2	D
7	153	<i>Number and Operations—Fractions</i>	NF.3	C
8	154	<i>Geometry</i>	G.1	
9	155	<i>Operations and Algebraic Thinking</i>	OA.3	C
10	155	<i>Number and Operations in Base Ten</i>	NBT.1	D
11	156	<i>Operations and Algebraic Thinking</i>	OA.8	B
12	157	<i>Operations and Algebraic Thinking</i>	OA.9	24
13	158	<i>Measurement and Data</i>	MD.4	$4\frac{3}{4}$ inches
14	159	<i>Measurement and Data</i>	MD.3	D
15	160	<i>Measurement and Data</i>	MD.2	D
16	160	<i>Measurement and Data</i>	MD.7	B
17	161	<i>Geometry</i>	G.2	C
18	162	<i>Operations and Algebraic Thinking</i>	OA.9	

* 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 3 Mathematics
Spring 2013 Unreleased Common Items:
Reporting Categories and Standards

Item No.	Reporting Category	Standard
19	<i>Measurement and Data</i>	MD.1
20	<i>Geometry</i>	G.1
21	<i>Measurement and Data</i>	MD.1
22	<i>Operations and Algebraic Thinking</i>	OA.1
23	<i>Operations and Algebraic Thinking</i>	OA.4
24	<i>Number and Operations—Fractions</i>	NF.3
25	<i>Number and Operations—Fractions</i>	NF.3
26	<i>Number and Operations in Base Ten</i>	NBT.1
27	<i>Operations and Algebraic Thinking</i>	OA.9
28	<i>Geometry</i>	G.2
29	<i>Measurement and Data</i>	MD.6
30	<i>Number and Operations in Base Ten</i>	NBT.2
31	<i>Operations and Algebraic Thinking</i>	OA.5
32	<i>Number and Operations—Fractions</i>	NF.1
33	<i>Measurement and Data</i>	MD.3
34	<i>Operations and Algebraic Thinking</i>	OA.8
35	<i>Operations and Algebraic Thinking</i>	OA.4
36	<i>Geometry</i>	G.1