IX. Mathematics, Grade 3

Grade 3 Mathematics Test

Test Sessions and Content Overview

The spring 2016 grade 3 Mathematics test was made up of two separate test sessions. Each session included:

▮ Eighteen common items, including multiple-choice, short-answer, and open-response questions. These common items are the items on which each student's 2016 MCAS Mathematics score will be based.

▮ Three items developed by the Partnership for Assessment of Readiness for College and Careers (PARCC), including multiple-choice, multiple-select, and open-response questions. Students' performance on these PARCC items will **not** be factored into their MCAS scores.

Approximately half of the common test items are shown on the following pages as they appeared in test & answer booklets.

The PARCC items are not being released in this document. The Department will post information about these items to the Student Assessment webpage in a separate document. See page 4 of the Introduction to this document for more information about the inclusion of PARCC items in the 2016 MCAS tests.

Standards and Reporting Categories

The common items in the spring 2016 grade 3 Mathematics test assessed 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 *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.

Standards and reporting categories for the PARCC items in the grade 3 Mathematics test will be listed in a separate document, which will be posted to the Student Assessment webpage.

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 7 immediately follows the last question in this chapter. An image of the ruler is not reproduced in this publication.

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

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 and one short-answer question. For multiple-choice questions, mark your answers by filling in the circle next to the best answer. For the short-answer question, write your answer in the space provided.

1 Ms. Hanson poured water into a jug, as shown below.

4 liters

3

2

1
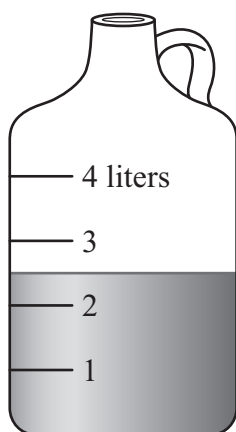
Which of these is closest to the amount of water in the jug?

- Ⓐ 2 liters
- Ⓑ $2\frac{1}{2}$ liters
- Ⓒ 3 liters
- Ⓓ $3\frac{1}{2}$ liters

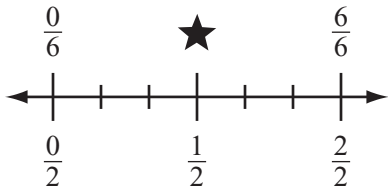**2** Jody wrote the expression shown below.

$$(2 \times 3) + (2 \times 5)$$

Which of these is another way to write Jody's expression?

- Ⓐ 2×8
- Ⓑ 4×8
- Ⓒ 4×15
- Ⓓ 6×10

3 Chas drew a number line to show equal fractions, as shown below.

Chas will write a fraction equal to $\frac{1}{2}$ to replace the ★. Which of these fractions should he write to replace the ★?

Ⓐ $\frac{1}{6}$

Ⓑ $\frac{2}{6}$

Ⓒ $\frac{3}{6}$

Ⓓ $\frac{4}{6}$

Question 4 is a short-answer question. Write your answer to this question in the Answer Box provided.

4 Compute:

$$42 \div 7$$

Write your answer in the Answer Box below.

Answer Box

4

Mark your choices for multiple-choice questions 5 through 7 by filling in the circle next to the best answer.
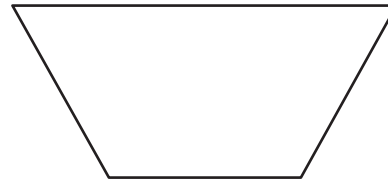
5 What is 946 rounded to the nearest hundred?

Ⓐ   800

Ⓑ   900

Ⓒ   950

Ⓓ   1000

6 April, June, September, and November each have 30 days. How many days are in the 4 months altogether?

Ⓐ   34

Ⓑ   70

Ⓒ   120

Ⓓ   136

Use the shapes labeled T *from your tool kit to answer question 7.*

7 Anjani used the shapes labeled T to cover the figure shown below without any gaps or overlaps.

What fraction of the figure does one of the shapes labeled T cover?

Ⓐ $\frac{1}{3}$

Ⓑ $\frac{1}{2}$

Ⓒ $\frac{2}{3}$

Ⓓ $\frac{3}{1}$

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 two open-response questions. 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.

*Use your MCAS ruler to answer question 8.*

8 A rectangle is shown below.
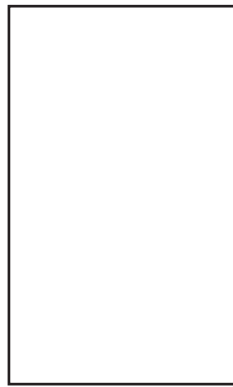
What is the perimeter, in centimeters, of the rectangle?

Ⓐ   8 centimeters

Ⓑ 10 centimeters

Ⓒ 15 centimeters

Ⓓ 16 centimeters

9 In which of these patterns is the next number an **odd** number?

Ⓐ 2, 4, 6, 8, . . .

Ⓑ 7, 12, 17, 22, . . .

Ⓒ 18, 15, 12, 9, . . .

Ⓓ 24, 20, 16, 12, . . .

10 Amy's house has a porch that is covered with 1-square-foot tiles. The porch is in the shape of a rectangle, as shown below.

Key
☐ = 1 square foot
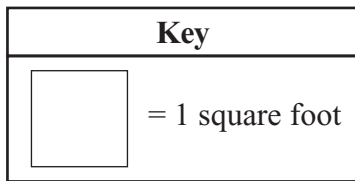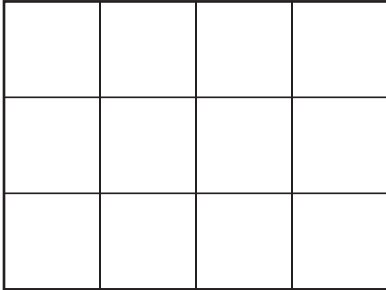
Amy counted the tiles to find the area of the porch.

Which of these is another way Amy could find the area, in square feet, of the porch?

Ⓐ (4 + 3) + (4 + 3)

Ⓑ (4 × 3) + (4 × 3)

Ⓒ 4 + 3

Ⓓ 4 × 3

Question 11 is a short-answer question. Write your answer to this question in the Answer Box provided.

11 There are 6 children on a bus. Each child is wearing a hat.

What **fraction** of the children on the bus are wearing a hat? Write your answer in the Answer Box below.

Answer Box

11

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

12 Claire wrote a number that is greater than zero on her paper. When Claire's number is multiplied by any whole number, the last digit of the product is always 0.

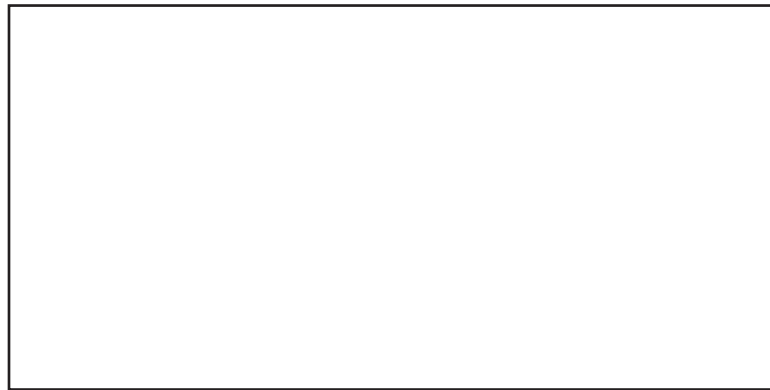In the Answer Box below, write a number that could be Claire's number.

Answer Box

12

Write your answers to parts (a) and (b) of open-response question 13 in the spaces provided.

Use your MCAS ruler to answer question 13.

13   A rectangle is shown below.

a. Draw line segments on the rectangle to divide the rectangle into 8 equal parts.

b. What fraction of the area of the whole rectangle is the area of each part?

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

14 Each student in a third-grade class made a paper snowflake and measured its length. The line plot below shows the length, in inches, of each paper snowflake.

```
            X
            X   X
        X   X   X
    X   X   X   X   X
 ───┼───┼───┼───┼───┼───┼───┼──►
    2  2½  3  3½  4  4½  5
```
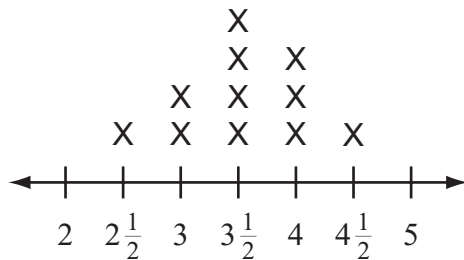
**Length of Paper Snowflakes
(in inches)**

What is the length, in inches, of the longest paper snowflake?

Ⓐ $3\frac{1}{2}$

Ⓑ 4

Ⓒ $4\frac{1}{2}$

Ⓓ 5

15 Ryan put 24 books on shelves. He put 8 books on each shelf.

Which equation can be used to find *s*, the number of shelves Ryan put books on?

Ⓐ $8 \times 24 = s$

Ⓑ $8 \div 24 = s$
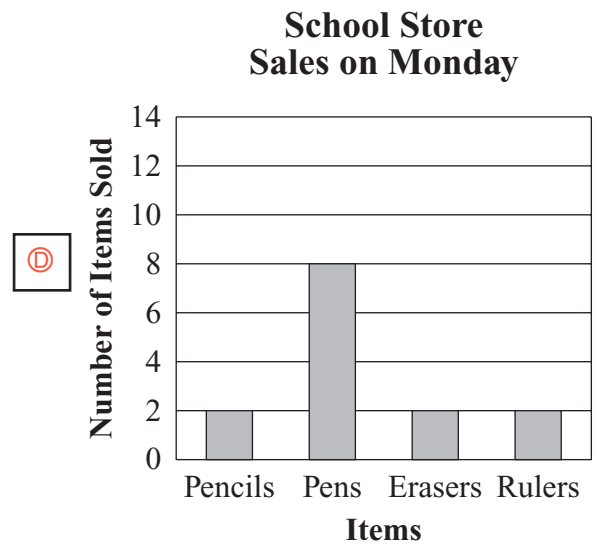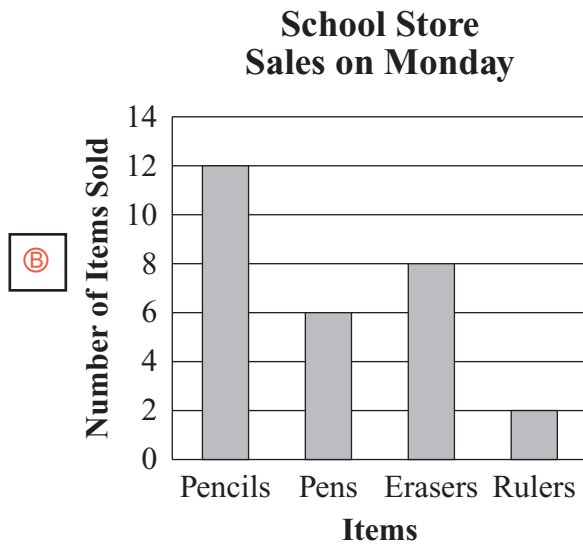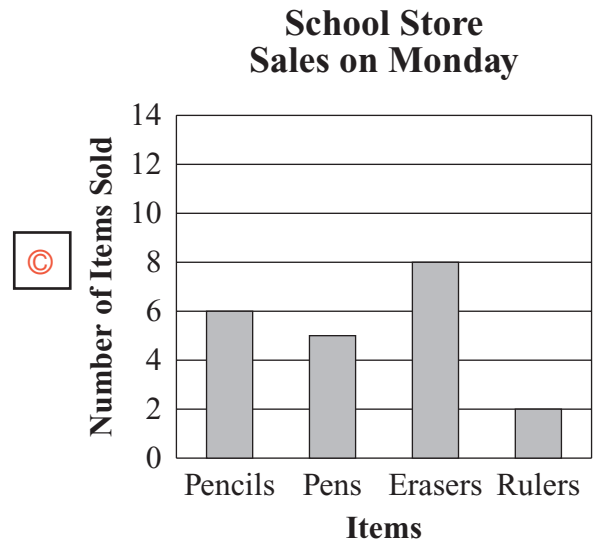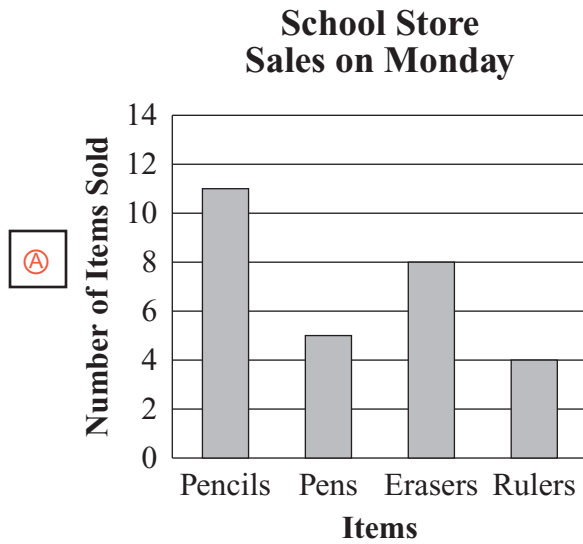
Ⓒ $s \times 8 = 24$

Ⓓ $s \div 8 = 24$

16 A pet store has 5 fish tanks with 10 fish in each tank. A shopper buys 8 fish and takes them home.

After the shopper leaves the store, what is the total number of fish left in the pet store's tanks?

Ⓐ 23

Ⓑ 42

Ⓒ 50

Ⓓ 58

17 On Monday, the school store sold pencils, pens, erasers, and rulers.

- The store sold 6 more pencils than pens.
- The store sold 2 times as many erasers as rulers.

Which of these bar graphs could show the items that were sold on Monday?

A

**School Store
Sales on Monday**

Number of Items Sold vs. Items (Pencils, Pens, Erasers, Rulers)
Pencils: 11, Pens: 5, Erasers: 8, Rulers: 4

C

**School Store
Sales on Monday**

Number of Items Sold vs. Items (Pencils, Pens, Erasers, Rulers)
Pencils: 6, Pens: 5, Erasers: 8, Rulers: 2

B

**School Store
Sales on Monday**

Number of Items Sold vs. Items (Pencils, Pens, Erasers, Rulers)
Pencils: 12, Pens: 6, Erasers: 8, Rulers: 2

D

**School Store
Sales on Monday**

Number of Items Sold vs. Items (Pencils, Pens, Erasers, Rulers)
Pencils: 2, Pens: 8, Erasers: 2, Rulers: 2

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

18   Christopher planted 24 bean plants in his garden. He placed the bean plants in 4 rows. Each row had the same number of plants.

a. Draw an array to show how Christopher placed all the bean plants in his garden.

b. How many bean plants did Christopher place in each row?
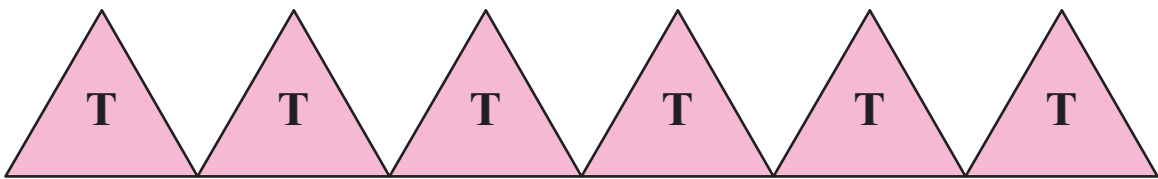
Grade 3 Mathematics
Spring 2016 Released Items:
Reporting Categories, Standards, and Correct Answers*

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC/SA)*
1	139	*Measurement and Data*	MD.2	B
2	139	*Operations and Algebraic Thinking*	OA.5	A
3	140	*Number and Operations-Fractions*	NF.3	C
4	141	*Operations and Algebraic Thinking*	OA.7	6
5	142	*Number and Operations In Base Ten*	NBT.1	B
6	142	*Number and Operations In Base Ten*	NBT.3	C
7	142	*Geometry*	G.2	A
8	143	*Measurement and Data*	MD.8	D
9	143	*Operations and Algebraic Thinking*	OA.9	B
10	144	*Measurement and Data*	MD.7	D
11	145	*Number and Operations-Fractions*	NF.3	6/6
12	146	*Number and Operations In Base Ten*	NBT.3	Any multiple of 10
13	147	*Geometry*	G.2	
14	148	*Measurement and Data*	MD.4	C
15	148	*Operations and Algebraic Thinking*	OA.6	C
16	148	*Operations and Algebraic Thinking*	OA.8	B
17	149	*Measurement and Data*	MD.3	A
18	150	*Operations and Algebraic Thinking*	OA.3	

* 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 2016 Unreleased Common Items:
Reporting Categories and Standards

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