
IX. Mathematics, Grade 3

Grade 3 Mathematics Test

The spring 2015 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 *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 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 8 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.

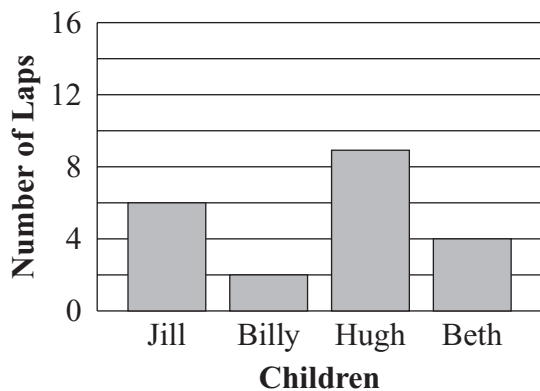


DIRECTIONS

This session contains five 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 in the space provided.

- 1 The graph below shows the numbers of laps four children ran in gym class.

Numbers of Laps Children Ran



What is the total number of laps the four children ran in gym class?

- (A) 21
- (B) 16
- (C) 11
- (D) 9

- 2 Ms. Garcia wrote the sentence shown in the box below.

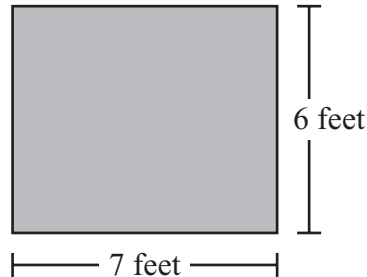
There are 8 students, and each student has 4 books.

Which of these can be used to find the total number of books?

- (A) 8×4
- (B) $8 - 4$
- (C) $8 \div 4$
- (D) $8 + 4$

Write your answers to parts (a) and (b) of open-response question 3 in the spaces provided.

- 3 Ms. Shaw has a quilt that is in the shape of a rectangle. The quilt is 7 feet long and 6 feet wide, as shown below.



- a. What is the perimeter, in feet, of Ms. Shaw’s quilt? Show or explain how you got your answer.

Perimeter: _____ feet

Ms. Garcia also has a quilt in the shape of a rectangle. Ms. Garcia’s quilt has the same perimeter as Ms. Shaw’s quilt but has a different area.

- b. What could be the length and the width, in feet, of Ms. Garcia’s quilt? Show or explain how you got your answer.

Length: _____ feet

Width: _____ feet

Mark your choices for multiple-choice questions 4 through 6 by filling in the circle next to the best answer.

- 4 Which of these sentences matches the expression in the box below?

$$30 \div 6$$

- (A) There are 30 students in Ms. Hall’s class, and 6 students are not in class.
- (B) There are 30 students in Ms. Hall’s class, and 6 new students join the class.
- (C) There are 30 students in Ms. Hall’s class, and the students are in 6 equal groups.
- (D) There are 30 students in Ms. Hall’s class, and each student brings in 6 plastic bottles.

- 5 What is the missing number that makes the number sentence below true?

$$165 + \boxed{?} = 214$$

- (A) 49
- (B) 51
- (C) 169
- (D) 379

- 6 The Walker family drove 362 miles.

What is 362 rounded to the nearest hundred?

- (A) 300
- (B) 360
- (C) 370
- (D) 400

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 eight multiple-choice questions, three 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.

- 7 The chart below shows the number of minutes for each field day activity.

Field Day Activity Times

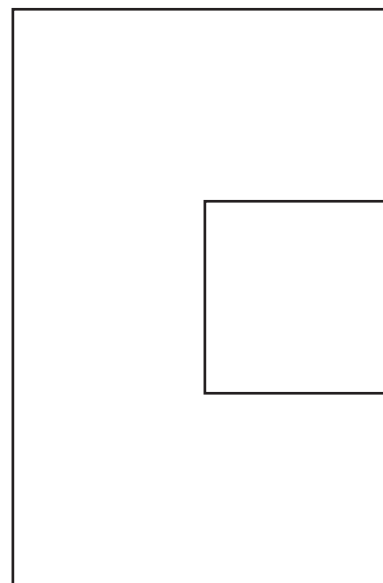
Activity	Time (in minutes)
Races	45
Egg Toss	20
Tag	15
Kickball	30

Which two activities take a total of **exactly** one hour?

- (A) Races and Egg Toss
- (B) Egg Toss and Kickball
- (C) Races and Tag
- (D) Tag and Kickball

Use the 1-inch tiles from your tool kit to answer question 8.

- 8 Hannah drew the shape shown below.



What is the area of the shape Hannah drew?

- (A) 5 square inches
- (B) 6 square inches
- (C) 10 square inches
- (D) 12 square inches

- 9 Which of these is equal to the expression below?

$$8 \times 6$$

- (A) $(5 \times 3) \times 6$
- (B) $(5 \times 3) + 6$
- (C) $(5 + 3) + 6$
- (D) $(5 + 3) \times 6$

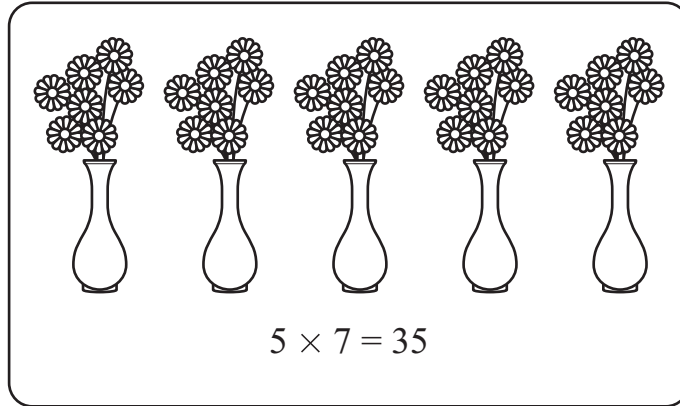
- 10 Anton cut a large piece of cloth into small rectangles. Each small rectangle has the same area. The area of each small rectangle is $\frac{1}{8}$ the area of the large piece.

How many small rectangles did Anton cut the large piece of cloth into?

- (A) 1
- (B) 7
- (C) 8
- (D) 9

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

- 11 Bonnie has a card with a picture that models a multiplication fact, as shown below.



In the Answer Box below, write a **division** fact that matches Bonnie’s picture.

Answer Box

11

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

- 12 The heights of six roller coasters are shown in the table below.

Roller Coaster Heights

Roller Coaster	Height (in feet)
Diamond Twist	315
Blue Beast	236
Captain Colossus	242
Scream Mountain	457
Mega Monster	419
Thunder Trail	301

Based on the table, the tallest roller coaster is how many feet taller than the shortest roller coaster?

Write your answer in the Answer Box below.

Answer Box

12

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

13 Abigail and Casey each ordered a pizza for lunch. Both pizzas were the same size. The pizzas could be cut into either 2, 4, 6, or 8 equal pieces.

a. Abigail ordered her pizza cut so that each piece had the smallest possible area. What fraction of Abigail's whole pizza is one piece?

b. Casey ordered his pizza cut so that it had half as many pieces as Abigail's pizza. Write a number sentence to compare a fraction that represents one piece of Casey's pizza and a fraction that represents one piece of Abigail's pizza. Use $>$, $<$, or $=$ in your number sentence.

Mark your choice for multiple-choice question 14 by filling in the circle next to the best answer.

14 Which pair of equations are related facts?

A $54 \div 6 = n$ and $6 \times n = 54$

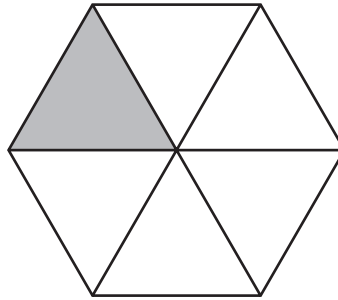
B $54 \div n = 6$ and $54 + 6 = n$

C $n \div 2 = 12$ and $12 - n = 2$

D $2 \div 12 = n$ and $n \times 2 = 12$

Question 15 is a short-answer question. Write your answer to this question in the Answer Box provided.

- 15 The shape below has a total area of 1 square unit. The shape is divided into equal parts. One part of the shape is shaded.



What is the area, in square units, of the shaded part of the shape? Write your answer as a **fraction** in the Answer Box below.

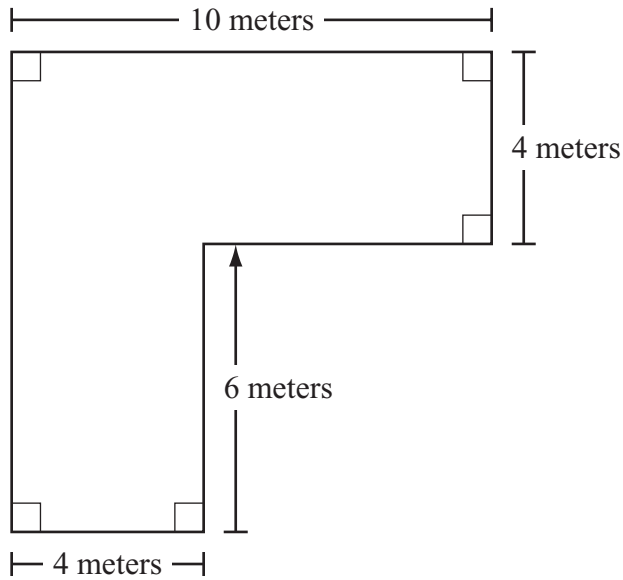
Answer Box

15

Mark your choices for multiple-choice questions 16 through 18 by filling in the circle next to the best answer.

- 16 Toni drew a diagram of the deck she is building, as shown below.

Toni's Deck



What is the area of the deck Toni is building?

- (A) 24 square meters
- (B) 40 square meters
- (C) 64 square meters
- (D) 80 square meters

- 17 Kane placed point H on a number line to show $\frac{3}{4}$. Which of these could be Kane's number line?

(A)

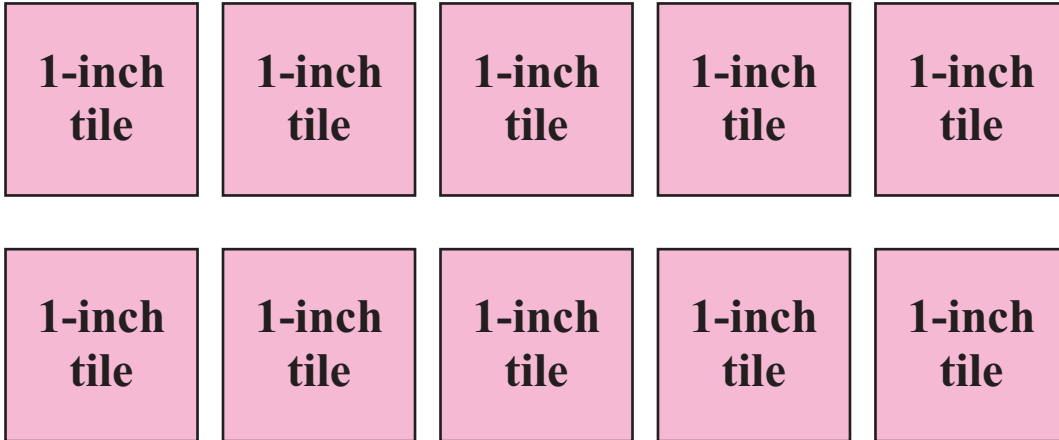
(B)

(C)

(D)

18 Which of these equations is true when $q = 8$?

- A $2 \times q = 4$
- B $2 \times q = 16$
- C $6 \div q = 2$
- D $12 \div q = 4$



Grade 3 Mathematics
Spring 2015 Released Items:
Reporting Categories, Standards, and Correct Answers*

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC/SA)*
1	138	<i>Measurement and Data</i>	MD.3	A
2	138	<i>Operations and Algebraic Thinking</i>	OA.1	A
3	139	<i>Measurement and Data</i>	MD.8	
4	140	<i>Operations and Algebraic Thinking</i>	OA.2	C
5	140	<i>Number and Operations in Base Ten</i>	NBT.2	A
6	140	<i>Number and Operations in Base Ten</i>	NBT.1	D
7	141	<i>Measurement and Data</i>	MD.1	C
8	141	<i>Measurement and Data</i>	MD.6	A
9	142	<i>Operations and Algebraic Thinking</i>	OA.5	D
10	142	<i>Geometry</i>	G.2	C
11	143	<i>Operations and Algebraic Thinking</i>	OA.7	$35 \div 5 = 7$ OR $35 \div 7 = 5$
12	144	<i>Number and Operations in Base Ten</i>	NBT.2	221 feet
13	145	<i>Number and Operations-Fractions</i>	NF.3	
14	146	<i>Operations and Algebraic Thinking</i>	OA.6	A
15	147	<i>Geometry</i>	G.2	$\frac{1}{6}$ square unit
16	148	<i>Measurement and Data</i>	MD.7	C
17	148	<i>Number and Operations-Fractions</i>	NF.2	B
18	149	<i>Operations and Algebraic Thinking</i>	OA.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 the shaded cells, will be posted to the Department's website later this year.

Grade 3 Mathematics
Spring 2015 Unreleased Common Items:
Reporting Categories and Standards

Item No.	Reporting Category	Standard
19	<i>Number and Operations-Fractions</i>	NF.3
20	<i>Measurement and Data</i>	MD.2
21	<i>Geometry</i>	G.1
22	<i>Number and Operations-Fractions</i>	NF.3
23	<i>Operations and Algebraic Thinking</i>	OA.4
24	<i>Operations and Algebraic Thinking</i>	OA.5
25	<i>Measurement and Data</i>	MD.4
26	<i>Measurement and Data</i>	MD.1
27	<i>Operations and Algebraic Thinking</i>	OA.2
28	<i>Number and Operations in Base Ten</i>	NBT.3
29	<i>Operations and Algebraic Thinking</i>	OA.9
30	<i>Geometry</i>	G.2
31	<i>Number and Operations in Base Ten</i>	NBT.2
32	<i>Measurement and Data</i>	MD.4
33	<i>Number and Operations-Fractions</i>	NF.1
34	<i>Operations and Algebraic Thinking</i>	OA.7
35	<i>Number and Operations in Base Ten</i>	NBT.3
36	<i>Operations and Algebraic Thinking</i>	OA.3