
IX. Mathematics, Grade 3

Grade 3 Mathematics Test

The spring 2017 grade 3 Mathematics test was a next-generation assessment, featuring a new test design and new item types. The test was administered in two formats: a computer-based version and a paper-based version. The test included both operational items, which count toward a student's score, and matrix items. The matrix portion of the test consisted of field-test questions that do not count toward a student's score.

In general, all students were administered the same operational items, regardless of whether they took the computer-based test or the paper-based test. In some instances, the wording or content of a paper item differed slightly from the computer-based version. More information about the differences between the computer-based and paper-based tests will be posted to the MCAS website at www.doe.mass.edu/mcas/.

This document displays the **paper-based versions** of the 2017 operational items that have been released. The **computer-based versions** of the released items are available on the MCAS Resource Center website at mcas.pearsonsupport.com.

Test Sessions and Content Overview

The grade 3 Mathematics test was made up of two separate test sessions. Each session included selected-response, short-answer, and constructed-response questions. On the paper-based test, the selected-response questions were multiple-choice items and multiple-select items, in which students select the correct answer(s) from among several answer options.

Standards and Reporting Categories

The 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 provide the following information about each released and unreleased operational item: reporting category, standard(s) covered, item type, and item description. The correct answers for released selected-response and short-answer questions are also displayed in the released item table.

Reference Materials and Tools

Each student taking the paper-based version of the grade 3 Mathematics test was provided with a plastic ruler. 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

This session contains 5 questions.

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



Directions

Read each question carefully and then answer it as well as you can. You must record all answers in this Test & Answer Booklet.

For some questions, you will mark your answers by filling in the circles in your Test & Answer Booklet. Make sure you darken the circles completely. Do not make any marks outside of the circles. If you need to change an answer, be sure to erase your first answer completely.

For other questions, you will need to fill in an answer grid. Directions for completing questions with answer grids are provided on the next page.

If a question asks you to show or explain your work, you must do so to receive full credit. Write your response in the space provided. Only responses written within the provided space will be scored.

Mathematics

Directions for Completing Questions with Answer Grids

1. Work the question and find an answer.
2. Write your answer in the boxes at the top of the grid.
3. Print only one number or symbol in each box. Do not leave a blank box in the middle of an answer.
4. Under each box, fill in the circle that matches the number or symbol you wrote above. Make a solid mark that completely fills the circle.
5. Do not fill in a circle under an unused box.
6. If you need to change an answer, be sure to erase your first answer completely.
7. See below for examples on how to correctly complete an answer grid.

EXAMPLES

To answer 632 in a question, fill in the answer grid as shown below.

6	3	2			
○	○	○	○	○	○
0	0	0	0	0	0
1	1	1	1	1	1
2	2	●	2	2	2
3	●	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
●	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

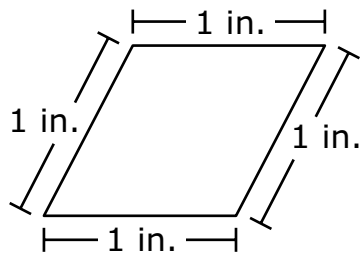
A brick path has 10 rows of 4 bricks. What is the total number of bricks in the path?

Enter your answer in the box.

4	0				
○	○	○	○	○	○
0	●	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
●	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

Mathematics

- 1 A shape and its side lengths are shown.



Which statement about the shape is true?

- Ⓐ The shape is a rhombus and a square.
- Ⓑ The shape is a rectangle and a square.
- Ⓒ The shape is a rhombus and a parallelogram.
- Ⓓ The shape is a rectangle and a parallelogram.

- 2** This table shows the number of people who went to the school play on three different days.

School Play

Day	Number of People
Friday	412
Saturday	345
Sunday	284

Part A

Round to the nearest ten the number of people who went to the school play on **each** of the three days. Show or explain how you got each of your answers.

Enter your answers and your work or explanation in the space provided.

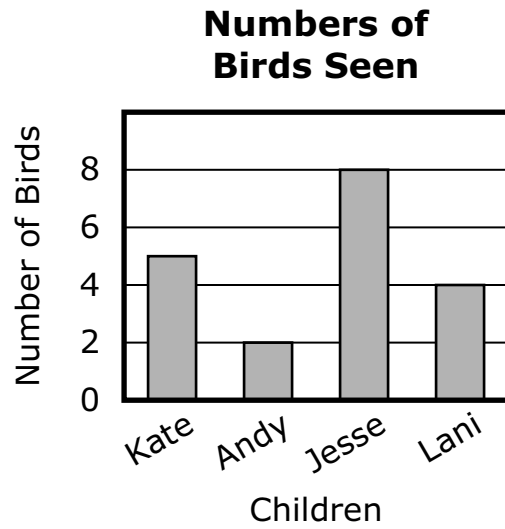
Part B

Isaac is rounding the three numbers in the table to the nearest **hundred**. He thinks two of the numbers will be the same after they are rounded. Show or explain why Isaac's reasoning is correct.

Enter your work or explanation in the space provided.

Mathematics

- 3 The bar graph shows the numbers of birds that four children saw one day.



How many **more** birds did Jesse see than Andy saw on that day?

Enter your answer in the box.

○	○	○	○	○	○
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

Mathematics

- 4 Laroy wrote the number sentence shown.

$$8 \times (3 + 2) = \boxed{?}$$

Which of these shows another way to solve Laroy's number sentence?

Ⓐ $(8 \times 3) + 2 = \boxed{?}$

Ⓑ $(8 \times 3) \times (8 \times 2) = \boxed{?}$

Ⓒ $(8 \times 3) + (8 \times 2) = \boxed{?}$

Ⓓ $(8 + 3) \times (8 + 2) = \boxed{?}$

Mathematics

5 Four friends used chocolate to make candy.

- Mari used $\frac{1}{2}$ pound of chocolate.
- Lois used $\frac{1}{6}$ pound of chocolate.
- Carolina used $\frac{1}{3}$ pound of chocolate.
- Evelyn used $\frac{1}{4}$ pound of chocolate.

Who used the greatest amount of chocolate?

- Ⓐ Mari
- Ⓑ Lois
- Ⓒ Carolina
- Ⓓ Evelyn

Grade 3 Mathematics
Spring 2017 Released Operational Items:
Reporting Categories, Standards, Item Descriptions, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Item Type*	Description	Correct Answer**
1	132	<i>Geometry</i>	3.G.1.01	SR	Determine which statement is true about a given shape's attributes.	C
2	133	<i>Number & Operations in Base Ten</i>	3.NBT.1.01	CR	Solve problems by rounding three-digit numbers to the nearest 10 and 100, with explanation and justification.	
3	135	<i>Measurement & Data</i>	3.MD.2.03	SA	Determine the solution to a real-world problem presented in a bar graph.	6 birds
4	136	<i>Operations & Algebraic Thinking</i>	3.OA.2.05	SR	Determine which expression shows another way to solve a given expression that includes multiplication and addition.	C
5	137	<i>Number & Operations-Fractions</i>	3.NF.1.03	SR	Determine the greatest fraction for a real-world situation.	A

* Mathematics item types are: selected-response (SR), short-answer (SA), and constructed-response (CR).

**Answers are provided here for selected-response and short-answer items only. Sample responses and scoring guidelines for any constructed-response items will be posted to the Department's website later this year.

Grade 3 Mathematics
Spring 2017 Unreleased Operational Items:
Reporting Categories, Standards, and Item Descriptions

Item No.	Reporting Category	Standard	Item Type*	Description
6	<i>Measurement & Data</i>	3.MD.3.06	SR	Determine the area of a given figure by counting the unit squares.
7	<i>Number & Operations-Fractions</i>	3.NF.1.03.a	SR	Determine which fraction on a number line is equivalent to a given fraction.
8	<i>Measurement & Data</i>	3.MD.2.04	SA	Determine the length of a given object by measuring with a ruler.
9	<i>Operations & Algebraic Thinking</i>	3.OA.1.03	SR	Solve a word problem involving multiplication.
10	<i>Geometry</i>	3.G.1.02	SR	Determine which fraction represents a given real-world problem.
11	<i>Operations & Algebraic Thinking</i>	3.OA.1.04	SR	Determine which whole number will make a given division equation true.
12	<i>Measurement & Data</i>	3.MD.1.01	SA	Determine the solution to a real-world problem involving time.
13	<i>Operations & Algebraic Thinking</i>	3.OA.1.03	CR	Create two equivalent multiplication expressions based on a real-world problem and justify why they are equivalent.
14	<i>Number & Operations in Base Ten</i>	3.NBT.1.02	SR	Determine the difference of 2 three-digit numbers.

Item No.	Reporting Category	Standard	Item Type*	Description
15	<i>Measurement & Data</i>	3.MD.1.02	SR	Determine which illustration shows the sum of two given amounts.
16	<i>Operations & Algebraic Thinking</i>	3.OA.3.07	SR	Determine which multiplication or division equation is true.
17	<i>Measurement & Data</i>	3.MD.4.08	SR	Given a shape and its dimensions, determine which shape with different given dimensions has the same area but different perimeter.
18	<i>Number & Operations in Base Ten</i>	3.NBT.1.01	SR	Determine which number would result when a given whole number is rounded to the nearest hundred.
19	<i>Number & Operations-Fractions</i>	3.NF.1.03	CR	Solve problems by comparing fractions and by reasoning about equal fraction amounts of different size wholes.
20	<i>Operations & Algebraic Thinking</i>	3.OA.1.01	SR	Determine which real-world situation can be represented by a given multiplication expression.
21	<i>Measurement & Data</i>	3.MD.4.08	SA	Determine the length of a side of a triangle given the perimeter and the lengths of the other two sides.
22	<i>Number & Operations-Fractions</i>	3.NF.1.03.b	SR	Identify two equations that show different equivalent fractions.
23	<i>Number & Operations-Fractions</i>	3.NF.1.02.b	SR	Determine which number line shows a point representing the location of a given fraction.
24	<i>Geometry</i>	3.G.1.01	SR	Determine which shape has the same number of angles as a given shape.
25	<i>Operations & Algebraic Thinking</i>	3.OA.1.04	SA	Find the value of an unknown variable in a division equation.
26	<i>Number & Operations-Fractions</i>	3.NF.1.01	SR	Determine which shaded figure shows a given fraction in a real-world context.
27	<i>Number & Operations in Base Ten</i>	3.NBT.1.02	SR	Find the solution to a subtraction problem with 2 three-digit numbers.
28	<i>Measurement & Data</i>	3.MD.3.07	CR	Solve a problem by finding the area of a rectangle and justify why another student's solution is not correct.
29	<i>Operations & Algebraic Thinking</i>	3.OA.3.07	SR	Determine which division expressions have a given quotient.
30	<i>Operations & Algebraic Thinking</i>	3.OA.4.08	SA	Solve real-world problems involving addition, subtraction and multiplication.
31	<i>Operations & Algebraic Thinking</i>	3.OA.1.01	SR	Determine which real-world situation can be represented by a given multiplication expression.
32	<i>Geometry</i>	3.G.1.02	SR	Determine which fraction represents one part of a circle that is divided into a given number of equal parts.
33	<i>Operations & Algebraic Thinking</i>	3.OA.3.07	SR	Determine which multiplication and division statements are true.
34	<i>Number & Operations in Base Ten</i>	3.NBT.1.03	SR	Find the product to a given multiplication problem with a one-digit whole number and a multiple of 10.
35	<i>Operations & Algebraic Thinking</i>	3.OA.4.09	SA	Determine the next number of a given pattern in a multiplication table.
36	<i>Measurement & Data</i>	3.MD.1.02	SA	Determine the mass by interpreting a scale and solve a one-step word problem with subtraction.
37	<i>Number & Operations in Base Ten</i>	3.NBT.1.03	SA	Given a real-world situation, determine the product of a one-digit number and a multiple of 10.
38	<i>Number & Operations-Fractions</i>	3.NF.1.03.a	SR	Determine which figure with a fractional amount shaded is equivalent to the amount shaded in a given shaded figure.
39	<i>Geometry</i>	3.G.1.01	SR	Determine which pair of polygons have the same number of vertices.
40	<i>Operations & Algebraic Thinking</i>	3.OA.1.02	SR	Determine which expression can be used to solve a division problem with a real-world context.

* Mathematics item types are: selected-response (SR), short-answer (SA), and constructed-response (CR).