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## IX. Mathematics, Grade 3

# Grade 3 Mathematics Test

The spring 2018 grade 3 Mathematics test was a next-generation assessment that 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 and equating questions that do not count toward a student's score.

Most of the operational items on the grade 3 Mathematics test were the same, regardless of whether a student took the computer-based version or the paper-based version. In some instances, the wording of a paper item differed slightly from the computer-based version. In places where a technology-enhanced item was used on the computer-based test, that item was typically replaced with one or more alternative items on the paper test. These alternative items sometimes assessed the same standard as the technology-enhanced item, or other standards from the same reporting category.

This document displays the **paper-based versions** of the 2018 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/released-items](https://mcas.pearsonsupport.com/released-items).

## 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* (2017). 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/](http://www.doe.mass.edu/frameworks/).

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 learner students only. No calculators, other reference tools, or materials were allowed.

# Grade 3 Mathematics

## SESSION 1

This session contains 9 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.

**Directions for Completing Questions with Answer Grids**

1. Work the question and find an answer.
2. Enter your answer in the answer boxes at the top of the answer 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 answer 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 answer box.
6. If you need to change an answer, be sure to erase your first answer completely.
7. See below for examples of how to correctly complete an answer grid.

**EXAMPLES**

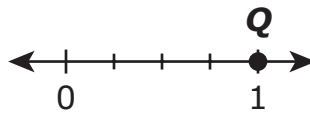
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- 1 Point Q is shown on this number line.



Which fraction best names point Q on the number line?

- (A)  $\frac{1}{4}$
- (B)  $\frac{1}{3}$
- (C)  $\frac{3}{4}$
- (D)  $\frac{4}{4}$

- 3 Ms. Manning has 138 markers.

What is 138 rounded to the nearest ten?

Enter your answer in the answer boxes at the top of the answer grid **and** completely fill the matching circles.

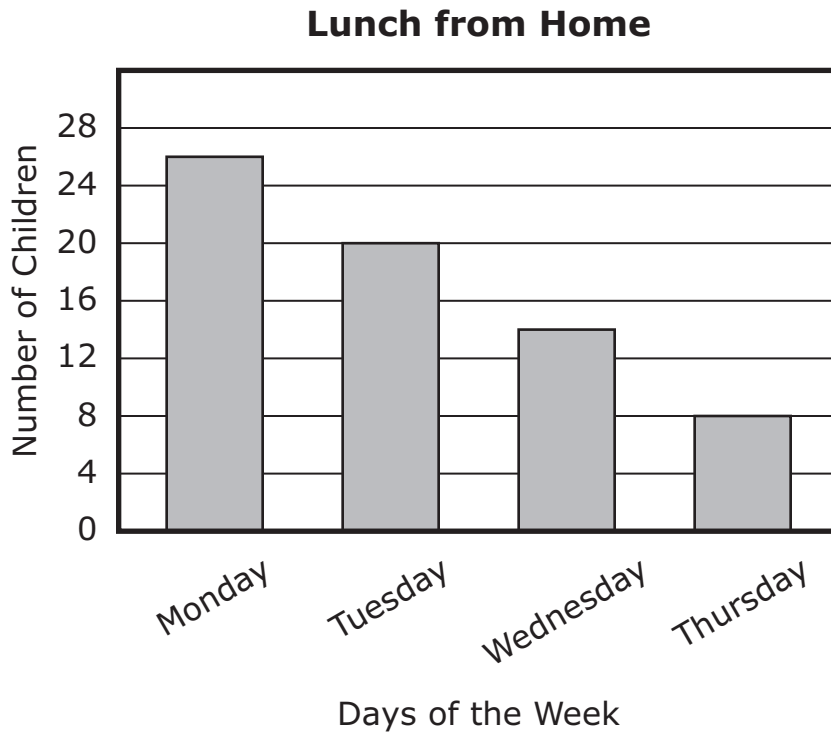
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5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

- 7 Deron bought some packs of baseball cards. Each pack had 5 baseball cards. He bought 30 baseball cards in all.

What is the total number of packs of baseball cards Deron bought?

- Ⓐ 8
- Ⓑ 7
- Ⓒ 6
- Ⓓ 5

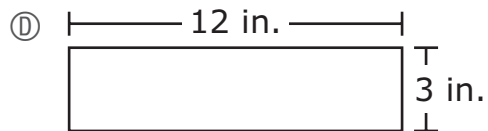
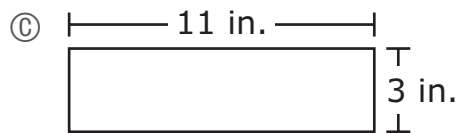
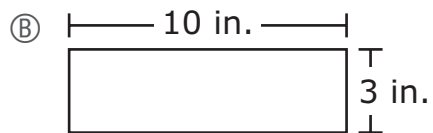
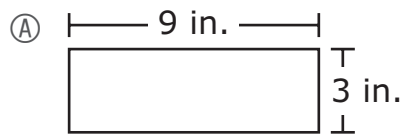
- 8 The bar graph shows the number of children who brought lunch from home each day for four days.



How many more children brought lunch from home on Monday than brought lunch from home on Thursday?

- (A) 12
- (B) 18
- (C) 22
- (D) 34

- 10 Which of these figures has the same area as a rectangle that has a length of 6 inches and a width of 5 inches?



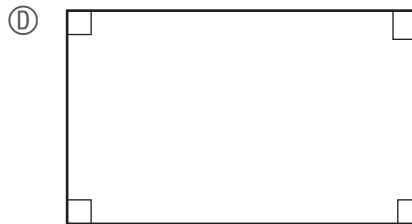
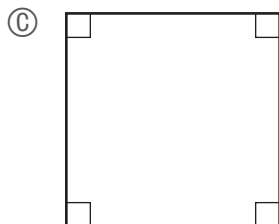
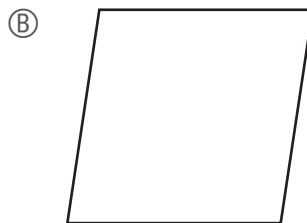
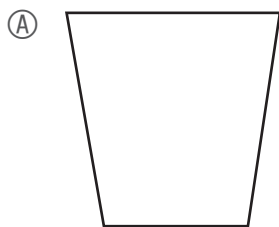


- 11 This model shows that  $\frac{4}{6}$  of the figure is shaded.



Which of these fractions is equal to  $\frac{4}{6}$ ?

- (A)  $\frac{2}{3}$
  - (B)  $\frac{3}{4}$
  - (C)  $\frac{6}{4}$
  - (D)  $\frac{2}{6}$
- 12 Which of these shapes is both a rhombus **and** a rectangle?



**This question has three parts.**

- 15** Kevin is cutting oranges and apples into smaller pieces.

**Part A**

Kevin cuts each orange into fourths. He has already cut 12 fourths.

How many oranges has Kevin cut so far? Show or explain how you got your answer.

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

**Part B**

Altogether, Kevin will have cut 8 oranges into fourths.

How many fourths will Kevin have cut in all? Show or explain how you got your answer.

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

**Part C**

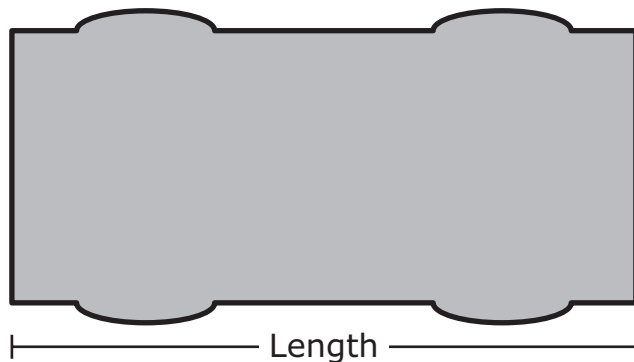
Kevin has 8 apples. He will cut each apple into sixths.

Will Kevin have more orange pieces or apple pieces? Show or explain how you got your answer.

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

Use your ruler to answer question 18.

- 18 Kyle traced his toy car, as shown.



What is the length, to the nearest fourth of an inch, of Kyle's toy car?

- Ⓐ  $3\frac{1}{4}$  inches
- Ⓑ  $3\frac{2}{4}$  inches
- Ⓒ  $4\frac{1}{4}$  inches
- Ⓓ  $4\frac{2}{4}$  inches

# Grade 3 Mathematics

## SESSION 2

This session contains 11 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.

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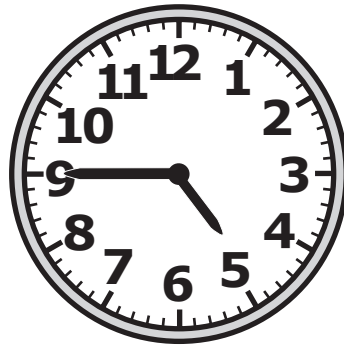
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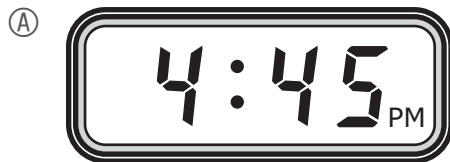
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- 21 Jackie's piano lesson starts at the time shown on this clock.



Which clock also shows the time Jackie's piano lesson starts?





- 22 Camila counted by 8s starting at 0.

Which of these statements is true?

- Ⓐ All of the numbers Camila counted were odd.
- Ⓑ All of the numbers Camila counted were even.
- Ⓒ All of the numbers Camila counted ended in 2, 4, or 8.
- Ⓓ Some of the numbers Camila counted were even, and some were odd.

- 27 Alyssa is solving this equation.

$$56 \div 7 = n$$

Which of these could Alyssa use to find the value of  $n$ ?

- Ⓐ  $7 \div 56 = n$
- Ⓑ  $7 \times 56 = n$
- Ⓒ  $n \div 7 = 56$
- Ⓓ  $n \times 7 = 56$

- 29 A student used the expression shown to solve a problem.

$$45 \div 9$$

Which of these could be the problem the student solved?

- (A) Owen had 45 seeds. He gave 9 seeds to Beth. How many seeds does Owen have now?
- (B) Owen had 45 seeds. Beth gave him 9 more seeds. How many seeds does Owen have now?
- (C) Owen put 45 seeds into each pot. He had 9 pots. How many seeds in all did Owen put into pots?
- (D) Owen had 45 seeds to put into pots. He put 9 seeds into each pot. How many pots did Owen put seeds into?

- 30 Nathan had 24 balloons. He gave some of his balloons to 3 friends. He gave each friend 5 balloons.

How many balloons does Nathan have now?

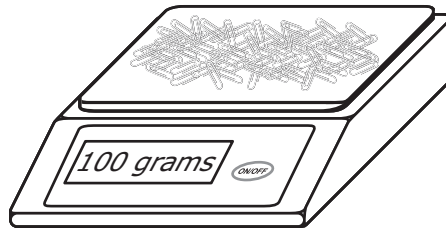
Enter your answer in the answer boxes at the top of the answer grid **and** completely fill the matching circles.

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6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

**31** Ms. Jeffers has 6 boxes of pencils. Each box contains 30 pencils.  
How many pencils does Ms. Jeffers have altogether?

- Ⓐ 36
- Ⓑ 90
- Ⓒ 126
- Ⓓ 180

**32** This scale shows the mass, in grams, of 100 paper clips.



Based on the mass of 100 paper clips, which of these is closest to the mass of 10 paper clips?

- Ⓐ 1 gram
- Ⓑ 10 grams
- Ⓒ 100 grams
- Ⓓ 1000 grams

**This question has three parts.**

- 35** Caleb planted a pear tree that was 227 centimeters tall and an apple tree that was 186 centimeters tall.

**Part A**

How much taller, in centimeters, was the pear tree than the apple tree when the trees were planted? Show or explain how you got your answer.

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

**Part B**

Write an addition equation to model the problem in Part A.

Enter your equation in the space provided.

**Part C**

The apple tree was 186 centimeters tall when it was planted. During the first year, it grew 19 centimeters.

What was the height, in centimeters, of the apple tree at the end of the first year? Show or explain how you got your answer.

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

- 37 How many sides does a parallelogram have in all?

Enter your answer in the answer boxes at the top of the answer grid **and** completely fill the matching circles.

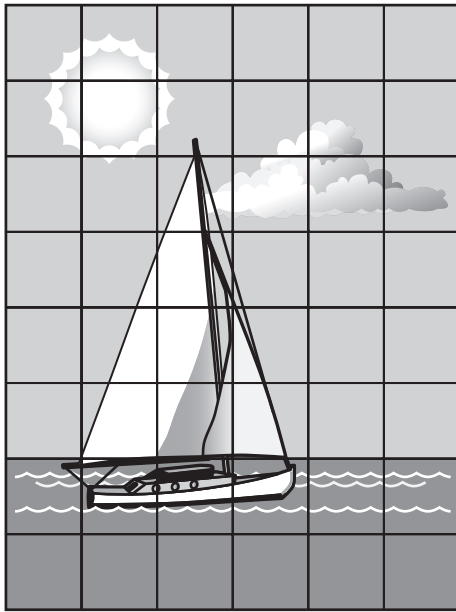
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6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9


- 38 Which of these is equal to this expression?

$$9 \times 8$$

- (A)  $(5 \times 8) + (4 \times 8)$
- (B)  $(5 + 8) \times (4 + 8)$
- (C)  $(5 \times 8) \times (4 \times 8)$
- (D)  $(5 + 8) + (4 + 8)$

- 39 Taylor used 1-square-inch pieces to complete a puzzle, as shown.



KEY	
	= 1 square inch

What is the area, in square inches, of Taylor’s puzzle?

Enter your answer in the answer boxes at the top of the answer grid **and** completely fill the matching circles.

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6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9



**Grade 3 Mathematics**  
**Spring 2018 Released Operational Items:**  
**Reporting Categories, Standards, Item Descriptions, and Correct Answers**

<b>PBT Item No.*</b>	<b>Page No.</b>	<b>Reporting Category</b>	<b>Standard</b>	<b>Item Type**</b>	<b>Description</b>	<b>Correct Answer***</b>
1	170	<i>Number &amp; Operations-Fractions</i>	3.NF.A.02	SR	Determine the fraction that is plotted on a given number line.	D
3	170	<i>Number &amp; Operations in Base Ten</i>	3.NBT.A.01	SA	Round a three-digit whole number to the nearest ten.	140
7	171	<i>Operations &amp; Algebraic Thinking</i>	3.OA.C.07	SR	Use division or a related multiplication fact to solve a word problem.	C
8	172	<i>Measurement &amp; Data</i>	3.MD.B.03	SR	Solve a one-step “how many more” problem using a given bar graph.	B
10	173	<i>Measurement &amp; Data</i>	3.MD.C.07	SR	Determine which rectangle has the same area as a rectangle with a given length and width.	B
11	174	<i>Number &amp; Operations-Fractions</i>	3.NF.A.03	SR	Determine the fraction that is equivalent to a given fraction model.	A
12	174	<i>Geometry</i>	3.G.A.01	SR	Determine which figure has the attributes of two given shapes.	C
15	175–177	<i>Number &amp; Operations-Fractions</i>	3.NF.A.01	CR	Determine the relationships between the number of equal parts and the number of wholes in a word problem.	
18	178	<i>Measurement &amp; Data</i>	3.MD.B.04	SR	Use a ruler to determine the length of a given figure to the nearest fourth of an inch.	A
21	181	<i>Measurement &amp; Data</i>	3.MD.A.01	SR	Identify the time given on an analog clock using a digital clock.	A
22	182	<i>Operations &amp; Algebraic Thinking</i>	3.OA.D.09	SR	Determine the terms of a numerical pattern and identify a feature that all the terms share.	B
27	182	<i>Operations &amp; Algebraic Thinking</i>	3.OA.B.06	SR	Determine the multiplication equation that could be used to solve a given division equation.	D
29	183	<i>Operations &amp; Algebraic Thinking</i>	3.OA.A.02	SR	Determine which word problem can be solved using a given division expression.	D
30	183	<i>Operations &amp; Algebraic Thinking</i>	3.OA.D.08	SA	Solve a two-step word problem using multiplication and addition.	9
31	184	<i>Number &amp; Operations in Base Ten</i>	3.NBT.A.03	SR	Solve a word problem by multiplying a one-digit whole number by a two-digit multiple of ten.	D
32	184	<i>Measurement &amp; Data</i>	3.MD.A.02	SR	Estimate the mass of one amount of an item based on a given figure showing the mass for a different amount of the same item.	B
35	185–187	<i>Number &amp; Operations in Base Ten</i>	3.NBT.A.02	CR	Add and subtract two- and three-digit numbers and demonstrate the relationship between addition and subtraction with an equation.	
37	188	<i>Geometry</i>	3.G.A.01	SA	Identify the number of a specific attribute a given figure has.	4
38	188	<i>Operations &amp; Algebraic Thinking</i>	3.OA.B.05	SR	Identify which expression using the distributive property is equivalent to a given expression.	A
39	189	<i>Measurement &amp; Data</i>	3.MD.C.06	SA	Find the area of a given figure by counting units or multiplying length and width.	48

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\*\* 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 2018 Unreleased Operational Items:**  
**Reporting Categories, Standards, and Item Descriptions**

<b>PBT Item No.*</b>	<b>Reporting Category</b>	<b>Standard</b>	<b>Item Type**</b>	<b>Description</b>
2	<i>Operations &amp; Algebraic Thinking</i>	3.OA.A.03	SR	Solve a word problem involving division of two whole numbers.
4	<i>Operations &amp; Algebraic Thinking</i>	3.OA.A.04	SR	Determine the missing factor in a multiplication equation.
5	<i>Number &amp; Operations in Base Ten</i>	3.NBT.A.02	SR	Solve a real-world problem by subtracting two three-digit whole numbers.
6	<i>Number &amp; Operations-Fractions</i>	3.NF.A.02	SR	Determine which point on a given number line represents the location of a given fraction.
9	<i>Operations &amp; Algebraic Thinking</i>	3.OA.D.09	CR	Find and justify the next number in a given pattern and explain a feature of the pattern.
13	<i>Operations &amp; Algebraic Thinking</i>	3.OA.A.03	SR	Solve a word problem given the relationship between two given whole number amounts.
14	<i>Measurement &amp; Data</i>	3.MD.C.07	SR	Determine the equation that can be used to find the area of a figure with a given length and width.
16	<i>Number &amp; Operations-Fractions</i>	3.NF.A.03	SR	From a given set of fractions, determine the fraction that is not equivalent to the other fractions.
17	<i>Operations &amp; Algebraic Thinking</i>	3.OA.A.01	SR	Determine how a two-digit product can be expressed as equal groups of equal numbers of objects.
19	<i>Measurement &amp; Data</i>	3.MD.D.08	SA	Determine the length of one rectangle given its width and the fact that it has the same perimeter as a second rectangle that is labeled with its length and width.
20	<i>Operations &amp; Algebraic Thinking</i>	3.OA.D.08	SR	Determine the most reasonable solution to a word problem involving multiplication of two whole numbers.
23	<i>Operations &amp; Algebraic Thinking</i>	3.OA.B.05	SA	Use the distributive property to complete a multiplication equation.
24	<i>Number &amp; Operations in Base Ten</i>	3.NBT.A.01	SR	Determine which expression with rounded numbers will give the best estimate when adding two whole numbers.
25	<i>Number &amp; Operations-Fractions</i>	3.NF.A.02	SR	Determine which fraction is represented by the location of a given point on a number line.
26	<i>Measurement &amp; Data</i>	3.MD.B.04	SA	Interpret a line plot with data in whole numbers and mixed numbers.
28	<i>Measurement &amp; Data</i>	3.MD.C.05	CR	Find the area of a given rectangle made of equal-sized square units and justify whether the areas of two other rectangles are equal or not.
33	<i>Geometry</i>	3.G.A.01	SR	Identify the true statement about the mathematical names of a set of given shapes.
34	<i>Number &amp; Operations in Base Ten</i>	3.NBT.A.03	SR	Solve a word problem by multiplying a single-digit whole number by a multiple of 10.
36	<i>Number &amp; Operations-Fractions</i>	3.NF.A.02	SR	Identify the fraction that is plotted on a given number line.
40	<i>Geometry</i>	3.G.A.02	SR	Determine which figure with part of its area shaded represents a given unit fraction.

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