



MASSACHUSETTS DEPARTMENT OF  
ELEMENTARY AND SECONDARY  
**EDUCATION**

*Release of Spring 2022  
MCAS Test Items*

*from the*

*Grade 3 Mathematics  
Paper-Based Test*

**June 2022**  
**Massachusetts Department of  
Elementary and Secondary Education**

# 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

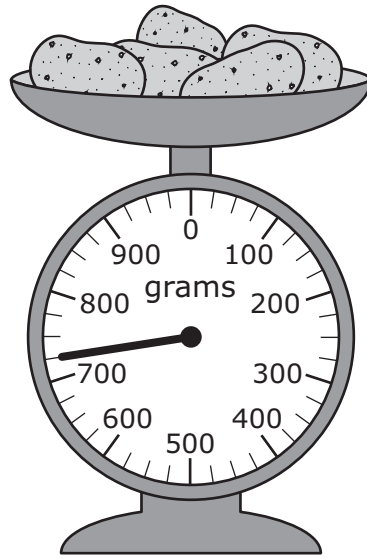
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9	9	9	<input checked="" type="radio"/>	9	9

- 1 This scale shows the mass of some potatoes.



What is the total mass, in grams, of the potatoes?

- Ⓐ 700 grams
- Ⓑ 725 grams
- Ⓒ 750 grams
- Ⓓ 775 grams

- 2 A coach used this equation to solve a problem.

$$36 \div 9 = p$$

Which of these could be the problem the coach solved?

- Ⓐ There were 36 players on each team. There were 9 teams. What was the total number of players on all the teams?
- Ⓑ There were 36 players on a team. Then, 9 players left the team. What is the total number of players on the team now?
- Ⓒ There were 36 players on a team. Then, 9 players joined the team. What is the total number of players on the team now?
- Ⓓ There were 36 players on a team. The players were split equally into 9 groups. What was the total number of players in each group?

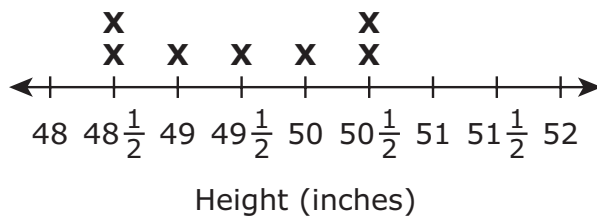
- 3 The heights, in inches, of eight students are shown in this list.

$48\frac{1}{2}$ ,  $50\frac{1}{2}$ , 49,  $50\frac{1}{2}$ , 50,  $48\frac{1}{2}$ ,  $49\frac{1}{2}$ , 50

Which line plot shows the heights, in inches, of all the students?

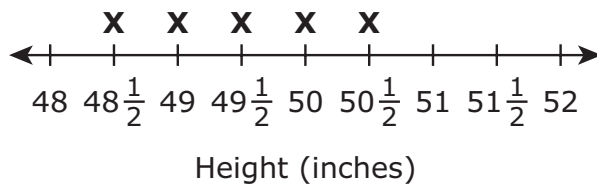
(A)

**Student Heights**



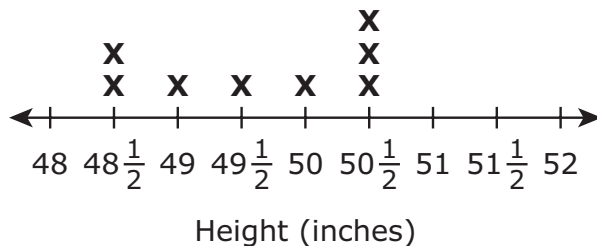
(B)

**Student Heights**



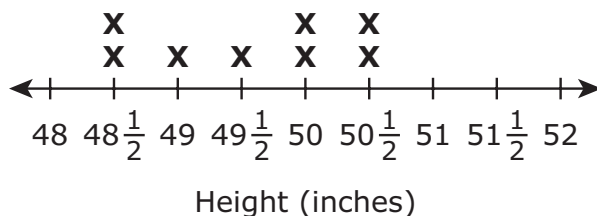
(C)

**Student Heights**



(D)

**Student Heights**



**4** Which of these statements are correct?

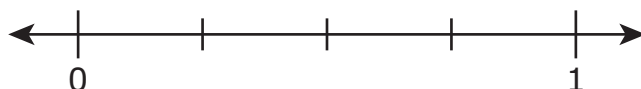
Select the **three** correct answers.

- Ⓐ The number 324 rounded to the nearest hundred is 300.
- Ⓑ The number 324 rounded to the nearest hundred is 400.
- Ⓒ The number 186 rounded to the nearest hundred is 100.
- Ⓓ The number 186 rounded to the nearest hundred is 200.
- Ⓔ The number 242 rounded to the nearest hundred is 200.
- Ⓕ The number 242 rounded to the nearest hundred is 300.

This question has three parts.

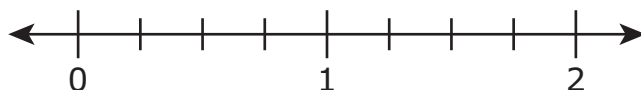
**5 Part A**

Plot the point that represents the location of  $\frac{1}{4}$  on this number line.



**Part B**

Plot the point that represents the location of  $\frac{3}{4}$  on this number line.



**Part C**

Plot the point that represents the location of  $\frac{7}{4}$  on this number line **and** explain how you know your answer is correct.



Enter your explanation in the space provided.



**6** Which of these equations are true?

Select the **three** correct answers.

Ⓐ  $9 \times 8 = 72$

Ⓑ  $9 \times 7 = 72$

Ⓒ  $35 \div 5 = 8$

Ⓓ  $35 \div 5 = 7$

Ⓔ  $9 \times 7 = 56$

Ⓕ  $8 \times 7 = 56$

**7** Which of these fractions is equivalent to the number 4?

Ⓐ  $\frac{1}{1}$

Ⓑ  $\frac{4}{1}$

Ⓒ  $\frac{1}{4}$

Ⓓ  $\frac{4}{4}$

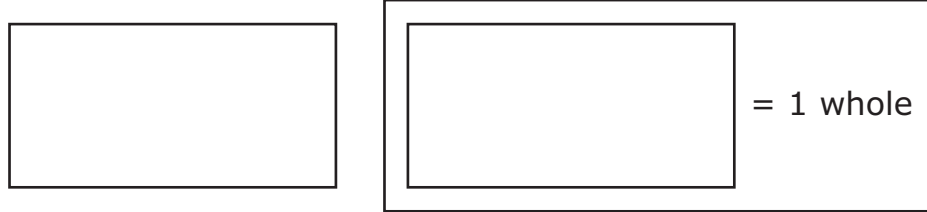
- 8 A student used multiplication to solve this division equation.

$$18 \div 3 = n$$

Which multiplication equation could the student have used to solve the division equation?

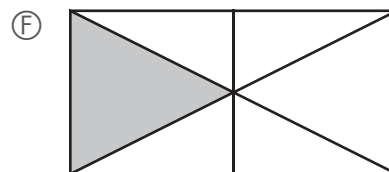
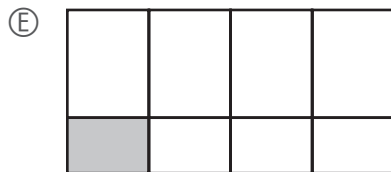
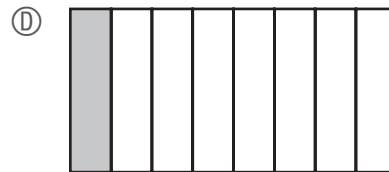
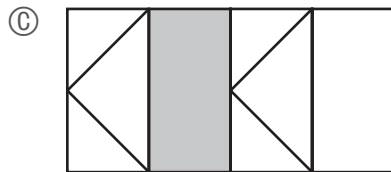
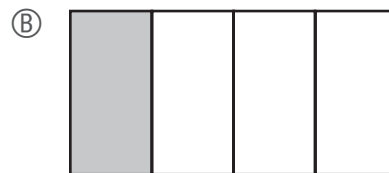
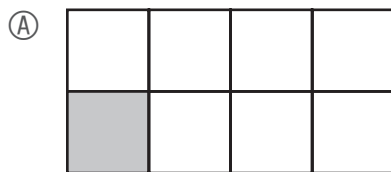
- Ⓐ  $18 \times 3 = n$
- Ⓑ  $n \times 18 = 3$
- Ⓒ  $n = 3 \times 18$
- Ⓓ  $18 = 3 \times n$

- 9 A student will shade  $\frac{1}{8}$  of this figure.



Which of these models have a shaded part that is  $\frac{1}{8}$  the area of the whole figure?

Select the **two** correct answers.



# Grade 3 Mathematics

## SESSION 2

This session contains 11 questions.

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### Directions

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## EXAMPLES

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7	7	7	7	7	7
8	<input checked="" type="radio"/>	8	8	8	8
9	9	9	<input checked="" type="radio"/>	9	9

- 10** A science class collected rocks in a park. The students put all of the rocks into 5 buckets. They put 70 rocks into each bucket.

What was the total number of rocks the students collected?

- Ⓐ 350 rocks
- Ⓑ 280 rocks
- Ⓒ 35 rocks
- Ⓓ 14 rocks

11 The first four numbers in a pattern are shown.

84, 76, 68, 60,   ?

What is the next number in the pattern?

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

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1	1	1	1	1	1
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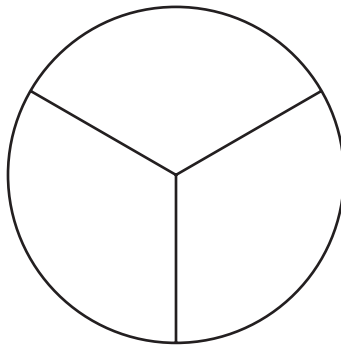
- 12** Cups of coffee were served at a parent meeting at a school. The number of cups served, rounded to the nearest **hundred**, was 200.

Which of these numbers could be the **actual** number of cups of coffee served?

Select the **two** correct answers.

- Ⓐ 109
- Ⓑ 267
- Ⓒ 152
- Ⓓ 254
- Ⓔ 231

- 13** A circle is divided into equal parts, as shown.



Which fraction of the area of the whole circle is one part?

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



- 14 Four fractions are shown in the box.

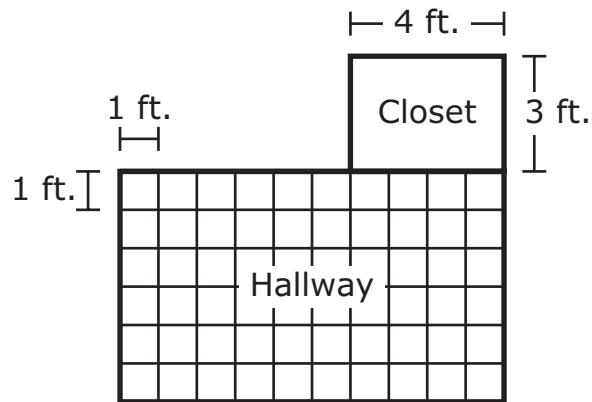
$\frac{2}{4}$	$\frac{2}{6}$	$\frac{3}{6}$	$\frac{4}{8}$
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Which fraction in the box is **not** equal to the other fractions in the box?

- Ⓐ  $\frac{2}{4}$
- Ⓑ  $\frac{2}{6}$
- Ⓒ  $\frac{3}{6}$
- Ⓓ  $\frac{4}{8}$

**This question has three parts.**

- 15** This diagram shows the floors of a hallway and a closet.



The hallway floor is covered with square tiles, with no gaps or overlaps. Each tile has a side length of 1 foot.

**Part A**

What is the area, in square feet, of the hallway floor? Show or explain how you got your answer.

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

**Part B**

The closet floor is in the shape of a rectangle with a length of 3 feet and a width of 4 feet.

Write an equation that can be used to find  $A$ , the area, in square feet, of the closet floor.

Enter your equation in the space provided.

**Part C**

Explain how to find the total area, in square feet, of the hallway floor **and** the closet floor. Be sure to include the total area in your answer.

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

**16** A student sold candy bars on Monday, Tuesday, and Wednesday.

- She sold a total of 125 candy bars over the three days.
- She sold 67 candy bars on Monday.
- She sold 19 candy bars on Tuesday.

What is the total number of candy bars the student sold on Wednesday?

- Ⓐ 39
- Ⓑ 58
- Ⓒ 86
- Ⓓ 211

- 17** Evan used exactly 20 paper clips to make an array.

Which of these could be the array Evan made?

- Ⓐ 2 rows of 20 paper clips
- Ⓑ 4 rows of 6 paper clips
- Ⓒ 5 rows of 4 paper clips
- Ⓓ 10 rows of 10 paper clips

- 18** There are 48 students in a library. The students are working in groups. Each group has 6 students.

Which equation can be used to find  $n$ , the number of groups of students working in the library?

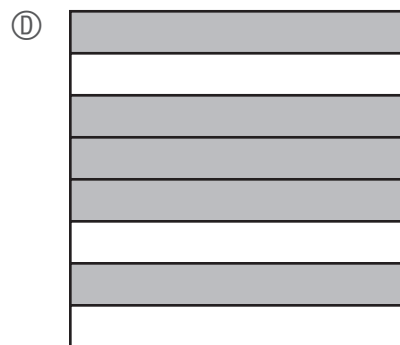
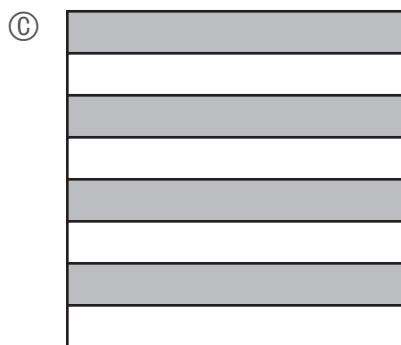
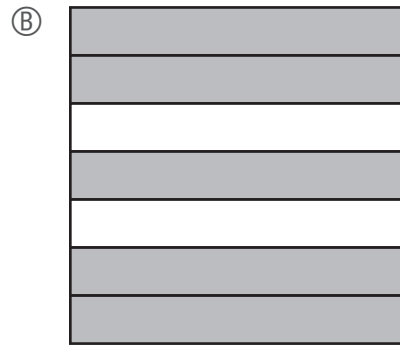
Ⓐ  $48 \div 6 = n$

Ⓑ  $n \div 6 = 48$

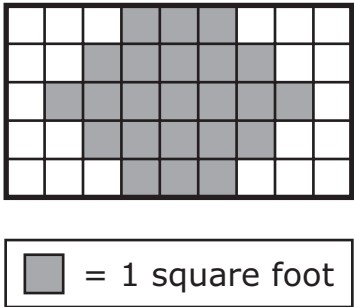
Ⓒ  $48 \times 6 = n$

Ⓓ  $n \times 48 = 6$

- 19 Which of these fraction models shows  $\frac{5}{8}$  of the model shaded?



20 This diagram shows a piece of artwork made with square tiles.



What is the total area, in square feet, of the **shaded** part of the artwork?

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

○	○	○	○	○	○
0	0	0	0	0	0
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9	9	9	9	9	9



**Grade 3 Mathematics**  
**Spring 2022 Released Operational Items**

PBT Item No.	Page No.	Reporting Category	Standard	Item Type*	Item Description	Correct Answer**
1	4	<i>Measurement and Data</i>	3.MD.A.2	SR	Interpret a measurement, in increments of 25, from a diagram of a metric scale.	B
2	5	<i>Operations and Algebraic Thinking</i>	3.OA.A.2	SR	Determine which word problem can be solved using a given division equation.	D
3	6	<i>Measurement and Data</i>	3.MD.B.4	SR	Create a line plot from a given set of data.	D
4	7	<i>Number and Operations in Base Ten</i>	3.NBT.A.1	SR	Round three-digit whole numbers to the nearest hundred.	A,D,E
5	8	<i>Number and Operations-Fractions</i>	3.NF.A.2	CR	Plot points to show the location of fractions on a given partitioned number line and give instructions on how to determine where to plot a fraction greater than one on a given partitioned number line.	
6	9	<i>Operations and Algebraic Thinking</i>	3.OA.A.4	SR	Determine which whole numbers will make given division and multiplication equations true.	A,D,F
7	9	<i>Number and Operations-Fractions</i>	3.NF.A.3	SR	Identify the fractional equivalent of a given whole number.	B
8	10	<i>Operations and Algebraic Thinking</i>	3.OA.B.6	SR	Determine the multiplication equation that can be used to help solve a given division equation.	D
9	11	<i>Geometry</i>	3.G.A.2	SR	Identify the shaded areas of shapes that represent a given fraction.	A,D
10	14	<i>Number and Operations in Base Ten</i>	3.NBT.A.3	SR	Solve a word problem by multiplying a single-digit whole number by a multiple of 10.	A
11	15	<i>Operations and Algebraic Thinking</i>	3.OA.D.9	SA	Identify the next term in a given subtraction pattern.	52
12	16	<i>Number and Operations in Base Ten</i>	3.NBT.A.1	SR	In a real-world problem, select numbers that, when rounded to the nearest hundred, will equal a specified number.	C,E
13	16	<i>Geometry</i>	3.G.A.2	SR	Determine the fraction that represents one part of a given circle that is divided into equal parts.	A
14	17	<i>Number and Operations-Fractions</i>	3.NF.A.3	SR	From a given set of fractions, determine the fraction that is not equivalent to the other fractions.	B
15	18–19	<i>Measurement and Data</i>	3.MD.C.7	CR	Determine the area of rectangles by counting squares or by multiplying the length times the width, and then determine the total area of a rectilinear figure.	
16	20	<i>Operations and Algebraic Thinking</i>	3.OA.D.8	SR	Solve a two-step word problem involving addition and subtraction.	A
17	21	<i>Operations and Algebraic Thinking</i>	3.OA.A.1	SR	Determine how a two-digit product can be expressed as equal groups of equal numbers of objects.	C
18	22	<i>Operations and Algebraic Thinking</i>	3.OA.A.3	SR	Determine the multiplication or division equation that can be used to solve a given word problem.	A
19	23	<i>Number and Operations-Fractions</i>	3.NF.A.1	SR	Determine the fraction model that represents a given fraction in the form $\frac{a}{b}$ .	D
20	24	<i>Measurement and Data</i>	3.MD.C.6	SA	Determine the area of an irregular shape by counting the square tiles that cover it.	23

\* 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 2022 Unreleased Operational Items**

<b>PBT Item No.</b>	<b>Reporting Category</b>	<b>Standard</b>	<b>Item Type*</b>	<b>Item Description</b>
21	<i>Number and Operations-Fractions</i>	3.NF.A.1	SR	Determine the fraction that is represented by a given fraction model.
22	<i>Measurement and Data</i>	3.MD.D.8	SR	Given shapes and their dimensions, determine which shape has a specified perimeter and has the largest area.
23	<i>Operations and Algebraic Thinking</i>	3.OA.C.7	SR	Identify a division expression that will have a given quotient.
24	<i>Measurement and Data</i>	3.MD.C.5	SR	Determine the correct statement relating square units to the area of a given figure.
25	<i>Measurement and Data</i>	3.MD.A.1	SR	Measure a time interval given a start and end time shown on two different digital clocks.
26	<i>Geometry</i>	3.G.A.1	SR	Identify the mathematical names of shapes that share two given attributes.
27	<i>Number and Operations-Fractions</i>	3.NF.A.3	SR	Identify a fraction that is equivalent to a given fraction when both fractions are represented by models.
28	<i>Operations and Algebraic Thinking</i>	3.OA.D.9	CR	Identify a given subtraction pattern, extend another pattern using the same rule, and use properties of odd and even numbers to describe similar features in the two patterns.
29	<i>Geometry</i>	3.G.A.1	SR	Determine which shapes are a specific type of quadrilateral.
30	<i>Measurement and Data</i>	3.MD.C.7	SR	Determine two expressions that can be used to find the area of a rectangle using the distributive property.
31	<i>Number and Operations in Base Ten</i>	3.NBT.A.3	SR	Solve a word problem by multiplying a single-digit whole number by a multiple of 10.
32	<i>Number and Operations-Fractions</i>	3.NF.A.1	SR	Determine which fraction model represents a given fraction.
33	<i>Measurement and Data</i>	3.MD.C.7	SR	Determine the equation that can be used when decomposing a rectilinear figure to find the total area.
34	<i>Operations and Algebraic Thinking</i>	3.OA.B.6	SR	Determine the multiplication equation that can be used to solve a division word problem.
35	<i>Operations and Algebraic Thinking</i>	3.OA.B.5	SA	Determine the missing factor that can be used with the distributive property to find equivalent products.
36	<i>Number and Operations-Fractions</i>	3.NF.A.2	SR	Identify the point on a partitioned number line that represents the location of a unit fraction.
37	<i>Number and Operations in Base Ten</i>	3.NBT.A.2	CR	Solve word problems involving addition and subtraction with three-digit whole numbers.
38	<i>Operations and Algebraic Thinking</i>	3.OA.A.3	SR	Use an array to identify a multiplication equation that matches a division equation.
39	<i>Measurement and Data</i>	3.MD.B.3	SR	Solve a one-step "how many more" problem using a given bar graph.
40	<i>Geometry</i>	3.G.A.1	SR	Identify the true statements about attributes of three types of quadrilaterals.

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