

Massachusetts MCAS 2021
Grade 4 Math

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MASSACHUSETTS DEPARTMENT OF
ELEMENTARY AND SECONDARY
EDUCATION

*Release of Spring 2021
MCAS Test Items*

from the

*Grade 4 Mathematics
Paper-Based Test*

June 2021

**Massachusetts Department of
Elementary and Secondary Education**

Grade 4 Mathematics

SESSION 1

This session contains 12 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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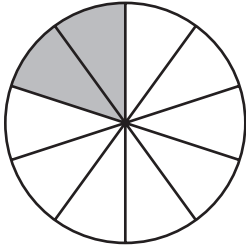
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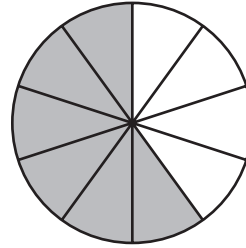
- 1 In which fraction model does the shaded part represent the sum of this expression?

$$\frac{1}{10} + \frac{7}{10}$$

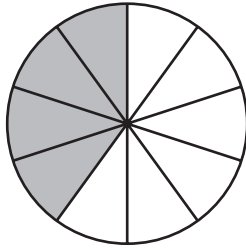
(A)



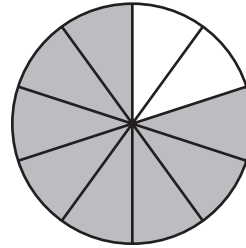
(B)



(C)



(D)



- 2 Takara is 4 years old. Her brother is 2 times as old as Takara.

Which equation can be used to find b , the age in years of Takara's brother?

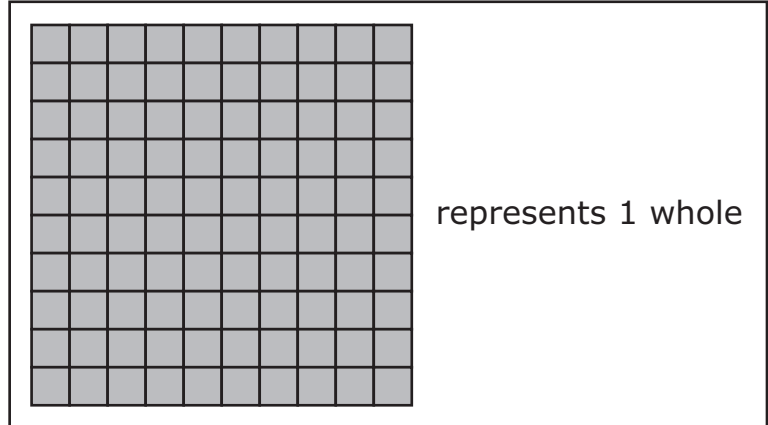
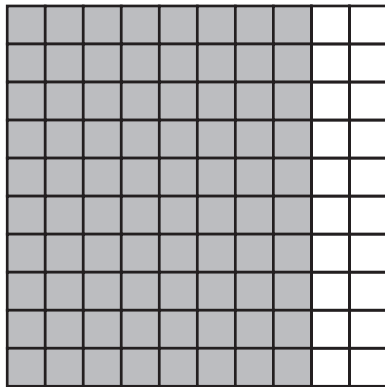
Ⓐ $b = 1 \times 2$

Ⓑ $b = 2 \times 2$

Ⓒ $b = 4 \times 2$

Ⓓ $b = 8 \times 2$

- 3 The shaded portion of this model represents a fraction less than 1.



Which of these decimals are equivalent to the fraction represented in the model?

Select the **two** correct answers.

- Ⓐ 0.80
- Ⓑ 8.0
- Ⓒ 0.08
- Ⓓ 80.0
- Ⓔ 0.8

- 4 Ms. Lewis bought 5 sticks of butter. Each stick of butter weighs $\frac{1}{4}$ pound.

What is the total weight, in pounds, of the 5 sticks of butter?

Ⓐ $\frac{5}{4}$

Ⓑ $\frac{6}{4}$

Ⓒ $\frac{1}{20}$

Ⓓ $\frac{5}{20}$

- 5 Which of these numbers are prime numbers?

Select the **two** correct answers.

Ⓐ 27

Ⓑ 43

Ⓒ 52

Ⓓ 67

Ⓔ 95

This question has four parts. Be sure to label each part of your response.

- 6** A. Write this number in standard form.

one hundred sixty-eight thousand, twenty-one

- B. Write the number 168,201 in expanded form.
- C. Use $>$, $<$, or $=$ to write a comparison of the two numbers in Part A and Part B. Explain how you got your answer.
- D. Write a number that is 1,000 greater than the number 169,201. Explain how you got your answer.

Write your answers on the next page.

6

- 7 A sign is in the shape of a square. Each side of the sign has a length of 6 inches.

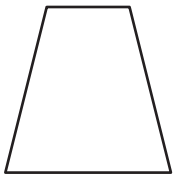
What is the area of the sign?

- Ⓐ 12 square inches
- Ⓑ 24 square inches
- Ⓒ 36 square inches
- Ⓓ 48 square inches

- 8 Which of these shapes have **at least** one line of symmetry?

Select the **three** correct answers.

Ⓐ



Ⓑ



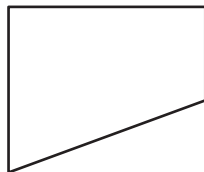
Ⓒ



Ⓓ



Ⓔ

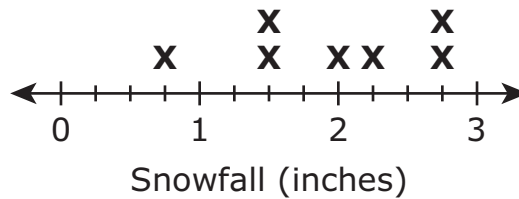


- 9 This list shows the snowfall amounts, in inches, for eight towns during a storm.

$$2\frac{1}{4}, 1\frac{1}{2}, 2, 2\frac{3}{4}, 1\frac{1}{2}, \frac{3}{4}, 2\frac{3}{4}, 1\frac{1}{4}$$

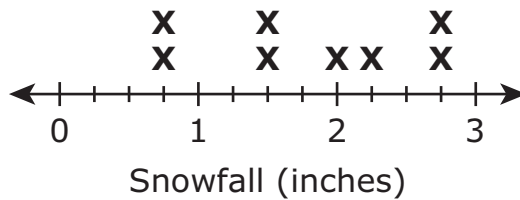
This line plot also shows some of the snowfall amounts. One of the snowfall amounts is missing from the line plot.

Snowfall Amounts

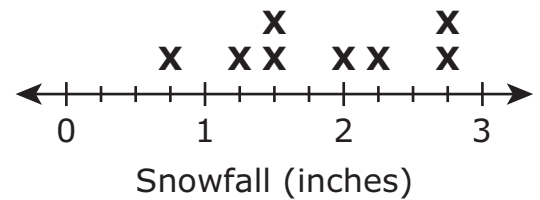


Which of these line plots shows all eight snowfall amounts correctly plotted?

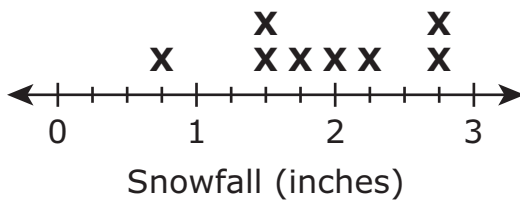
Ⓐ **Snowfall Amounts**



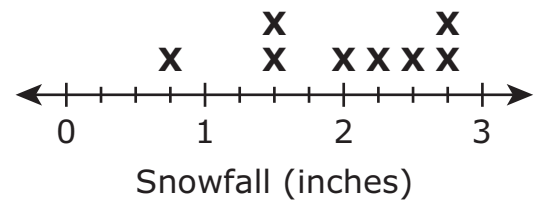
Ⓑ **Snowfall Amounts**



Ⓒ **Snowfall Amounts**



Ⓓ **Snowfall Amounts**



- 10 What is the value of $\boxed{?}$ that makes this number sentence true?

$$325 = 147 + \boxed{?}$$

- Ⓐ 178
- Ⓑ 188
- Ⓒ 222
- Ⓓ 472

- 11 The rule for a pattern is “multiply by 3.” The first number in the pattern is 2.
What is the **fifth** 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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0	0	0	0	0	0
1	1	1	1	1	1
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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

- 12 What value of x makes this equation true?

$$\frac{7}{10} = \frac{x}{100}$$

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

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7	7	7	7	7	7
8	8	8	8	8	8
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Grade 4 Mathematics

SESSION 2

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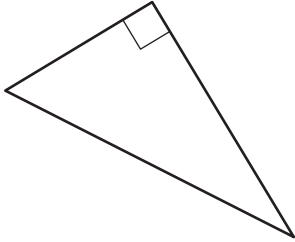
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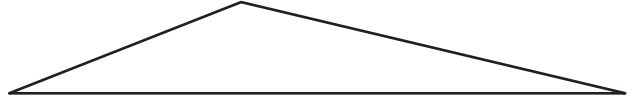
- 13** Which of these triangles have at least one obtuse angle?

Select the **two** correct answers.

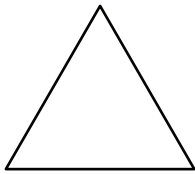
Ⓐ



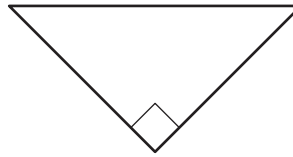
Ⓑ



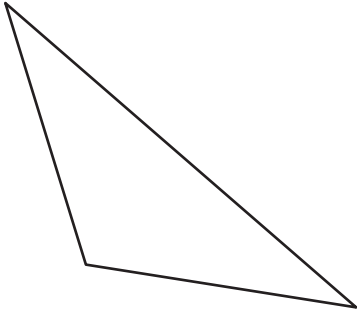
Ⓒ



Ⓓ



Ⓔ



This question has four parts. Be sure to label each part of your response.

- 14** This clock shows the time that Cary woke up this morning.



- A. At what time did Cary wake up? Be sure to label your answer with a.m. or p.m.
- B. Cary left for school 1 hour and 15 minutes after he woke up. At what time did Cary leave for school? Show or explain how you got your answer.
- C. Cary left school at 3:40. He ate lunch 4 hours before he left school. At what time did Cary eat lunch? Show or explain how you got your answer.
- D. Cary has 45 minutes of homework. His favorite TV show is at 5:30. What is the **latest** time Cary can start his homework to be finished at 5:30? Show or explain how you got your answer.

Write your answers on the next page.

14

- 15** Alonzo and Mindy are buying pretzels to share with their class. They will put all the pretzels into bags.

- Alonzo buys 8 pretzels.
- Mindy buys 3 times as many pretzels as Alonzo.
- Each bag will hold up to 5 pretzels.

Alonzo and Mindy want to know the least number of bags they need to hold all the pretzels.

Which of these statements are true?

Select the **two** correct answers.

- Ⓐ Alonzo and Mindy have a total of 24 pretzels.
- Ⓑ Alonzo and Mindy have a total of 32 pretzels.
- Ⓒ Alonzo and Mindy need 5 bags to hold all the pretzels.
- Ⓓ Alonzo and Mindy need 6 bags to hold all the pretzels.
- Ⓔ Alonzo and Mindy need 7 bags to hold all the pretzels.

This question has two parts.

- 16 A shopper bought peppers and grapes.

Part A

The shopper bought $\frac{54}{100}$ pound of peppers.

What is the decimal equivalent of the fraction $\frac{54}{100}$?

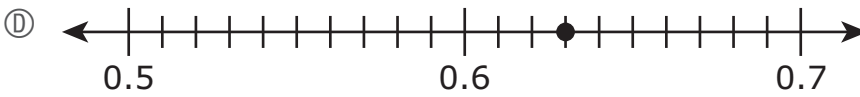
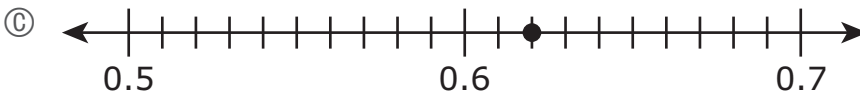
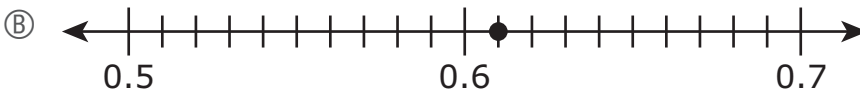
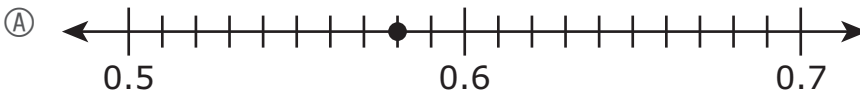
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8	8	8	8	8	8
9	9	9	9	9	9

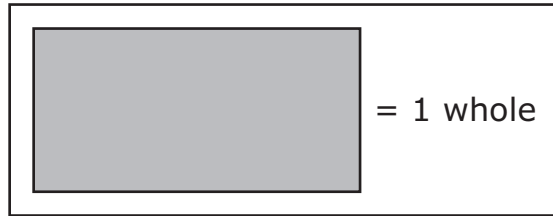
Part B

The shopper bought 0.62 pound of grapes.

Which of these number lines shows a point that represents where 0.62 is located?



- 17 A model of 1 whole is shown.



Based on the model, which of these models is shaded to represent a fraction that is equivalent to $1\frac{2}{3}$?

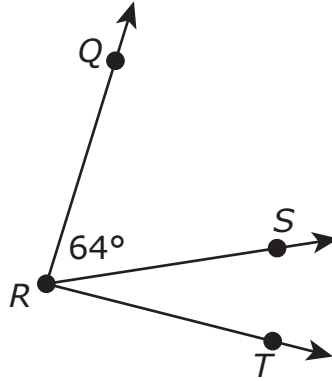
- Ⓐ
- Ⓑ
- Ⓒ
- Ⓓ

- 18** Which of these numbers round to 30,000 when rounding to the nearest **ten thousand**?

Select the **two** correct answers.

- Ⓐ 34,124
- Ⓑ 35,021
- Ⓒ 37,826
- Ⓓ 32,788
- Ⓔ 36,249

- 19 Angle QRS has a measure of 64° , as shown in this diagram.



Angle QRT has a measure of 87° . What is the measure of angle SRT ?

- Ⓐ 23°
- Ⓑ 26°
- Ⓒ 64°
- Ⓓ 151°

- 20 A parent bought equal amounts of blue cloth and yellow cloth to make a costume. The parent used $\frac{3}{6}$ of the blue cloth and $\frac{4}{12}$ of the yellow cloth.

Which of these number sentences correctly compare the fractions

$\frac{3}{6}$ and $\frac{4}{12}$?

Select the **two** correct answers.

Ⓐ $\frac{3}{6} > \frac{4}{12}$

Ⓑ $\frac{3}{6} < \frac{4}{12}$

Ⓒ $\frac{4}{12} = \frac{3}{6}$

Ⓓ $\frac{4}{12} > \frac{3}{6}$

Ⓔ $\frac{4}{12} < \frac{3}{6}$

Grade 4 Mathematics
Spring 2021 Released Operational Items

PBT Item No.	Page No.	Reporting Category	Standard	Item Type*	Item Description	Correct Answer**
1	4	<i>Number and Operations-Fractions</i>	4.NF.B.3	SR	Determine which fraction model represents the sum of two given fractions with like denominators.	D
2	5	<i>Operations and Algebraic Thinking</i>	4.OA.A.1	SR	Determine which equation represents a multiplicative comparison in a word problem.	C
3	6	<i>Number and Operations-Fractions</i>	4.NF.C.6	SR	Determine which decimals are equivalent to a given amount represented by a visual model.	A,E
4	7	<i>Number and Operations-Fractions</i>	4.NF.B.4	SR	Solve a word problem by multiplying a fraction by a whole number.	A
5	7	<i>Operations and Algebraic Thinking</i>	4.OA.B.4	SR	Identify prime numbers.	B,D
6	8	<i>Number and Operations in Base Ten</i>	4.NBT.A.2	CR	Express multi-digit whole numbers in standard and expanded forms and use place value understanding to compare the numbers with symbols and to explain your answer.	
7	10	<i>Measurement and Data</i>	4.MD.A.3	SR	Use the area formula to find the area of a square.	C
8	10	<i>Geometry</i>	4.G.A.3	SR	Determine which shapes have at least one line of symmetry.	A,C,D
9	11	<i>Measurement and Data</i>	4.MD.B.4	SR	Determine which line plot represents given data.	B
10	12	<i>Number and Operations in Base Ten</i>	4.NBT.B.4	SR	Given one three-digit addend and the three-digit sum, determine the missing addend.	A
11	13	<i>Operations and Algebraic Thinking</i>	4.OA.C.5	SA	Determine a specified term in a pattern given the first number and the rule of the pattern.	162
12	14	<i>Number and Operations-Fractions</i>	4.NF.C.5	SA	Determine the numerator of a fraction with a denominator of 100 that makes it equivalent to a given fraction with a denominator of 10.	70
13	17	<i>Geometry</i>	4.G.A.1	SR	Identify obtuse angles in triangles.	B,E
14	18	<i>Measurement and Data</i>	4.MD.A.2	CR	Solve real-world problems involving reading an analog clock and adding and subtracting time intervals.	
15	20	<i>Operations and Algebraic Thinking</i>	4.OA.A.3	SR	Given a multi-step word problem, divide whole numbers and interpret the remainder to determine which statements that describe the problem are true.	B,E
16	21–22	<i>Number and Operations-Fractions</i>	4.NF.C.6	SA	Write a decimal equivalent for a given fraction and choose which number line shows a point that represents a given decimal.	0.54;C
17	23	<i>Number and Operations-Fractions</i>	4.NF.A.1	SR	Identify a fraction model that represents a fraction equivalent to a given mixed number.	D
18	24	<i>Number and Operations in Base Ten</i>	4.NBT.A.3	SR	Determine which multi-digit whole numbers, when rounded to the nearest ten thousand, round to a given number.	A,D
19	25	<i>Measurement and Data</i>	4.MD.C.7	SR	Determine an angle measure given the measure of an adjacent angle and the sum of both angle measures.	A
20	26	<i>Number and Operations-Fractions</i>	4.NF.A.2	SR	Determine which number sentences with the symbols $<$, $>$, or $=$ correctly compare two given fractions with different numerators and denominators.	A,E

* 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 4 Mathematics
Spring 2021 Unreleased Operational Items

PBT Item No.	Reporting Category	Standard	Item Type*	Item Description
21	<i>Measurement and Data</i>	4.MD.C.6	SR	Determine the angle measure of an angle in a triangle shown on a protractor.
22	<i>Number and Operations in Base Ten</i>	4.NBT.B.5	SA	Find the product of two two-digit whole numbers.
23	<i>Operations and Algebraic Thinking</i>	4.OA.A.1	SR	Determine which verbal statement of multiplicative comparison represents a given equation in a word problem.
24	<i>Number and Operations-Fractions</i>	4.NF.A.2	CR	Write a fraction comparison using symbols, compare fractions with different denominators, and critique the reasoning of others about different-sized wholes in a word problem.
25	<i>Measurement and Data</i>	4.MD.A.3	SR	Select the expressions that can be used to find the perimeter of a rectangle, given the length and width.
26	<i>Operations and Algebraic Thinking</i>	4.OA.B.4	SR	Determine which statements about multiples are true and identify three factor pairs of a given number.
27	<i>Number and Operations-Fractions</i>	4.NF.C.7	SR	Determine which number sentences with the symbols $<$, $>$, or $=$ correctly compare two decimals to hundredths.
28	<i>Operations and Algebraic Thinking</i>	4.OA.A.2	SR	Determine which equation represents a multiplicative comparison word problem.
29	<i>Number and Operations-Fractions</i>	4.NF.A.1	SR	Choose the fraction model that represents an equivalent fraction of a given fraction with a denominator of 100.
30	<i>Operations and Algebraic Thinking</i>	4.OA.A.2	SA	Solve a word problem using a multiplicative comparison.
31	<i>Operations and Algebraic Thinking</i>	4.OA.C.5	SR	Determine which statements about patterns are true, given a starting number and a rule for each pattern described.
32	<i>Measurement and Data</i>	4.MD.C.5	SR	Give the measure of an angle that turns through a portion of a circle.
33	<i>Number and Operations in Base Ten</i>	4.NBT.B.5	SA	Determine the product of a four-digit whole number and a one-digit whole number.
34	<i>Number and Operations-Fractions</i>	4.NF.B.3	SR	Determine the sum of two mixed numbers with like denominators.
35	<i>Geometry</i>	4.G.A.2	CR	Identify right and obtuse triangles from a given set of triangles, and identify two-dimensional figures that have at least one pair of perpendicular sides.
36	<i>Number and Operations in Base Ten</i>	4.NBT.A.1	SR	Identify statements that correctly describe the relationship between digits in multi-digit whole numbers.
37	<i>Number and Operations-Fractions</i>	4.NF.C.7	SR	Determine which number sentences with the symbols $<$, $>$, or $=$ correctly compare decimals given in tenths and hundredths.
38	<i>Number and Operations in Base Ten</i>	4.NBT.B.4	SA	Subtract a four-digit whole number from another four-digit whole number.
39	<i>Number and Operations in Base Ten</i>	4.NBT.B.6	SR	Determine the whole number quotient of a four-digit dividend and a one-digit divisor.
40	<i>Measurement and Data</i>	4.MD.A.1	SR	Determine the number of minutes given a time in hours that includes a fraction.

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