

Ohio's State Tests

ITEM RELEASE

SPRING 2017

**GRADE 4
MATHEMATICS**

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Grade 4 Math
Spring 2017 Item Release
Content Summary and Answer Key

Question No.	Item Type	Content Cluster	Content Standard	Answer Key	Points
1	Equation Item	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. b. Understand a multiple of $\frac{a}{b}$ as a multiple of $\frac{1}{b}$, and use this understanding to multiply a fraction by a whole number. <i>For example, use a visual fraction model to express $3 \times (\frac{2}{5})$ as $6 \times (\frac{1}{5})$, recognizing this product as $\frac{6}{5}$. (In general, $n \times (\frac{a}{b}) = (\frac{n \times a}{b})$) (4.NF.4b)</i>	---	1 point
2	Multi-Select item	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. (4.G.3)	A, C, E	1 point
3	Graphic Response Item	Extend understanding of fraction equivalence and ordering.	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model. (4.NF.2)	---	2 points

Grade 4 Math
Spring 2017 Item Release
Content Summary and Answer Key

Question No.	Item Type	Content Cluster	Content Standard	Answer Key	Points
4	Equation Item	Use place value understanding and properties of operations to perform multi-digit arithmetic.	Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (4.NBT.5)	---	1 point
5	Multiple Choice	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$; $\frac{3}{8} = \frac{1}{8} + \frac{2}{8}$; $2\frac{1}{8} = 1 + 1 + \frac{1}{8} = \frac{8}{8} + \frac{8}{8} + \frac{1}{8}$. (4.NF.3b)	C	1 point
6	Short Response	Generate and analyze patterns.	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. <i>For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.</i> (4.OA.5)	---	1 point

Grade 4 Math
Spring 2017 Item Release
Content Summary and Answer Key

Question No.	Item Type	Content Cluster	Content Standard	Answer Key	Points
7	Equation Item	Generalize place value understanding for multi-digit whole numbers.	Use place value understanding to round multi-digit whole numbers to any place. (4.NBT.3)	---	1 point
8	Equation Item	Geometric measurement: understand concepts of angle and measure angles.	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure. (4.MD.7)	---	1 point
9	Equation Item	Use the four operations with whole numbers to solve problems.	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (4.OA.3)	---	1 point

Grade 4 Math
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Content Summary and Answer Key

Question No.	Item Type	Content Cluster	Content Standard	Answer Key	Points
10	Multiple Choice	Extend understanding of fraction equivalence and ordering.	Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{(n \times a)}{(n \times b)}$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. (4.NF.1)	D	1 point
11	Equation Item	Geometric measurement: understand concepts of angle and measure angles.	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees. (4.MD.5b)	---	1 point
12	Equation Item	Use place value understanding and properties of operations to perform multi-digit arithmetic.	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (4.NBT.6)	---	2 points

Grade 4 Math
Spring 2017 Item Release
Content Summary and Answer Key

Question No.	Item Type	Content Cluster	Content Standard	Answer Key	Points
13	Graphic Response Item	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. (4.G.3)	---	1 point
14	Multi-Select Item	Use the four operations with whole numbers to solve problems.	Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. (4.OA.1)	A, C	1 point
15	Graphic Response Item	Understand decimal notation for fractions, and compare decimal fractions.	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model. (4.NF.7)	---	2 points
16	Multi-Select Item	Generalize place value understanding for multi-digit whole numbers.	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons. (4.NBT.2)	A, D	1 point

Grade 4 Math
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Content Summary and Answer Key

Question No.	Item Type	Content Cluster	Content Standard	Answer Key	Points
17	Graphic Response Item	Represent and interpret data.	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection. (4.MD.4)</i>	---	1 point

**Grade 4
Math
Spring 2017 Item Release**

Question 1

Question and Scoring Guidelines

Question 1

An expression is shown.

$$12 \times \frac{3}{100}$$

What is the value of the expression? Enter the number in the box.

← → ↶ ↷ ✖

1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Points Possible: 1

Content Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

Content Standard: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

b. Understand a multiple of $\frac{a}{b}$ as a multiple of $\frac{1}{b}$, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express $3 \times (\frac{2}{5})$ as $6 \times (\frac{1}{5})$, recognizing this product as $\frac{6}{5}$. (In general, $n \times (\frac{a}{b}) = (\frac{n \times a}{b})$) (4.NF.4b)

Scoring Guidelines

Exemplar Response

- $\frac{36}{100}$

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- A correct value (1 point).

**Grade 4
Math
Spring 2017 Item Release**

Question 1

Sample Responses

Sample Response: 1 point

An expression is shown.

$$12 \times \frac{3}{100}$$

What is the value of the expression? Enter the number in the box.

$$\frac{36}{100}$$



1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the value of the expression.

- The student may use repeated addition to identify the value of the expression.

$$12 \times \frac{3}{100}$$

$$= \frac{3}{100} + \frac{3}{100} + \frac{3}{100} + \frac{3}{100} + \frac{3}{100} + \frac{3}{100} + \frac{3}{100} + \frac{3}{100} + \frac{3}{100} + \frac{3}{100} + \frac{3}{100} + \frac{3}{100}$$

$$= \frac{36}{100}$$

While it may be convenient for students to place fractions in simplest form to help with problem solving, students are not required to place fractions in simplest form. A student can earn credit by identifying an equivalent value to a correct response.

Sample Response: 1 point

An expression is shown.

$$12 \times \frac{3}{100}$$

What is the value of the expression? Enter the number in the box.

$$\frac{9}{25}$$



1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the value of the expression.

- The student may multiply 12 by $\frac{3}{100}$ and place his or her answer in simplest form.

$$\begin{aligned} 12 \times \frac{3}{100} \\ &= \frac{12}{1} \times \frac{3}{100} \\ &= \frac{36}{100} \end{aligned}$$

$$\frac{36}{100} \div \frac{4}{4} = \frac{9}{25}$$

Sample Response: 0 points

An expression is shown.

$$12 \times \frac{3}{100}$$

What is the value of the expression? Enter the number in the box.

$$\frac{36}{1200}$$



1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the value of the expression.

- The student may incorrectly multiply the numerator and denominator by 12.

$$12 \times \frac{3}{100}$$

$$\neq \frac{12}{12} \times \frac{3}{100}$$

$$= \frac{36}{1200}$$

Sample Response: 0 points

An expression is shown.

$$12 \times \frac{3}{100}$$

What is the value of the expression? Enter the number in the box.

$$\frac{3}{1200}$$



1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the value of the expression.

- The student may incorrectly multiply by the reciprocal of 12.

$$12 \times \frac{3}{100}$$

$$\neq \frac{1}{12} \times \frac{3}{100}$$

$$= \frac{3}{1200}$$

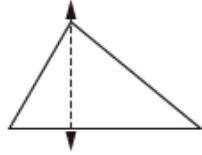
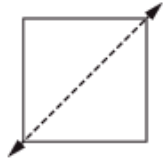
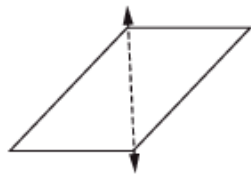
**Grade 4
Math
Spring 2017 Item Release**

Question 2

Question and Scoring Guidelines

Question 2

Select the **three** figures that show a line of symmetry correctly drawn.

☐☐☐☐☐

Points Possible: 1

Content Strand: Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Content Standard: Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. (4.G.3)

Scoring Guidelines

Rationale for First Option: **Key** – The student correctly identifies a line of symmetry.

Rationale for Second Option: This is incorrect. The student may mistake the height of the triangle for a line of symmetry.


Rationale for Third Option: **Key** – The student correctly identifies a line of symmetry.

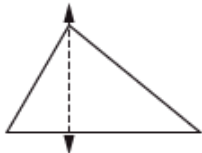
Rationale for Fourth Option: This is incorrect. The student may mistake a diagonal for a line of symmetry.

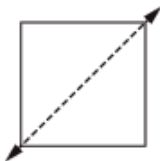
Rationale for Fifth Option: **Key** – The student correctly identifies a line of symmetry.

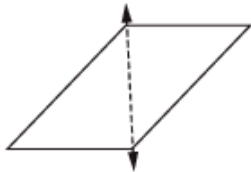
Sample Response: 1 point


Select the **three** figures that show a line of symmetry correctly drawn.

☒ 

☐ 

☒ 

☐ 

☒ 

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Question 3

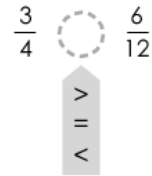
Question and Scoring Guidelines

Question 3

Two fractions and two unshaded fraction models are shown.

- A. Select the comparison symbol that correctly compares the two fractions.
- B. Select sections of each fraction model to represent the comparison.

A.



B.



Points Possible: 2

Content Cluster: Extend understanding of fraction equivalence and ordering.

Content Standard: Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model. (4.NF.2)

Scoring Guidelines


Exemplar Response

A.

$\frac{3}{4}$ $>$ $\frac{6}{12}$

$>$
 $=$
 $<$

B.



Other Correct Responses

- Any equivalent pair of fraction models with a correct comparison is accepted.

For this item, a full-credit response includes:

- A correct comparison (1 point)
AND
- A correct pair of models (1 point).

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Question 3

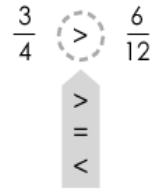
Sample Responses

Sample Response: 2 points

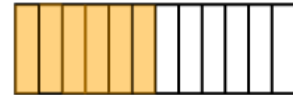
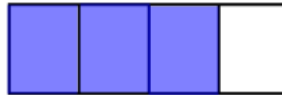
Two fractions and two unshaded fraction models are shown.

- A. Select the comparison symbol that correctly compares the two fractions.
- B. Select sections of each fraction model to represent the comparison.

A.



B.



Notes on Scoring

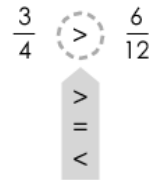
This response earns full credit (2 points) because it identifies the correct comparison symbol that compares the two fractions, and it creates a fraction model to represent the comparison.

Sample Response: 2 points

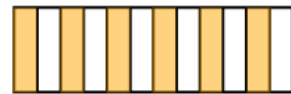
Two fractions and two unshaded fraction models are shown.

- A. Select the comparison symbol that correctly compares the two fractions.
- B. Select sections of each fraction model to represent the comparison.

A.



B.



Notes on Scoring

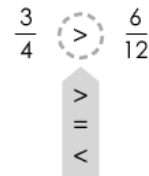
This response earns full credit (2 points) because it identifies the correct comparison symbol that compares the two fractions, and it creates a fraction model to represent the comparison.

Sample Response: 1 point

Two fractions and two unshaded fraction models are shown.

- A. Select the comparison symbol that correctly compares the two fractions.
- B. Select sections of each fraction model to represent the comparison.

A.

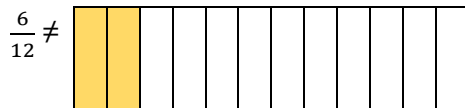


B.



Notes on Scoring

This response earns partial credit (1 point) because it identifies the correct comparison symbol that compares the two fractions, but it creates an incorrect fraction model to represent the comparison.

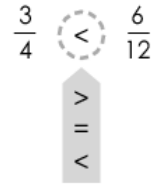


Sample Response: 1 point

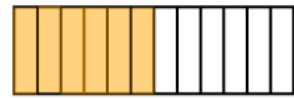
Two fractions and two unshaded fraction models are shown.

- A. Select the comparison symbol that correctly compares the two fractions.
- B. Select sections of each fraction model to represent the comparison.

A.



B.



Notes on Scoring

This response earns partial credit (1 point) because it incorrectly identifies the comparison symbol that compares the two fractions, but it creates a correct fraction model to represent the comparison.

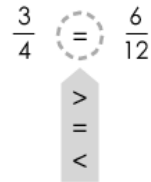
- The student may think that the numbers 6 and 12 are both greater than 3 and 4 and, therefore, the fraction $\frac{6}{12}$ is greater than $\frac{3}{4}$.

Sample Response: 0 points

Two fractions and two unshaded fraction models are shown.

- Select the comparison symbol that correctly compares the two fractions.
- Select sections of each fraction model to represent the comparison.

A.



B.



Notes on Scoring

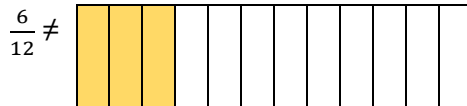
This response earns no credit (0 points) because it incorrectly identifies the comparison symbol that compares the two fractions, and it creates an incorrect fraction model to represent the comparison.

- The student may find incorrect equivalent fractions using division to compare $\frac{3}{4}$ and $\frac{6}{12}$.

$$\frac{6}{12} \div \frac{2}{3} \neq \frac{3}{4} \quad \text{and} \quad \frac{3}{4} = \frac{3}{4}$$

$$\frac{6}{12} \neq \frac{3}{4}$$

- The student incorrectly creates the representation of $\frac{6}{12}$ in a visual model.



Sample Response: 0 points

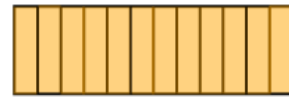
Two fractions and two unshaded fraction models are shown.

- Select the comparison symbol that correctly compares the two fractions.
- Select sections of each fraction model to represent the comparison.

A.

$$\frac{3}{4} \quad \begin{matrix} \text{=} \\ \text{>} \\ \text{=} \\ \text{<} \end{matrix} \quad \frac{6}{12}$$

B.



Notes on Scoring

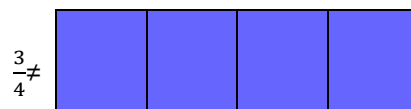
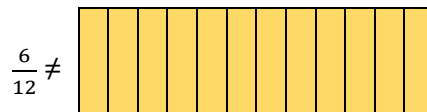
This response earns no credit (0 points) because it incorrectly identifies the comparison symbol that compares the two fractions, and it creates an incorrect fraction model to represent the comparison.

- The student may find incorrect equivalent fractions using division to compare $\frac{3}{4}$ and $\frac{6}{12}$.

$$\frac{6}{12} \div \frac{2}{3} \neq \frac{3}{4} \quad \text{and} \quad \frac{3}{4} = \frac{3}{4}$$

$$\frac{6}{12} \neq \frac{3}{4}$$

- The student incorrectly creates the representations of $\frac{3}{4}$ and $\frac{6}{12}$ in visual models.



**Grade 4
Math
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Question 4

Question and Scoring Guidelines

Question 4

What is the product of 24 and 13? Enter the number in the box.

← → ↶ ↷ ✕

1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Points Possible: 1

Content Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic.

Content Standard: Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (4.NBT.5)

Scoring Guidelines

Exemplar Response

- 312

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- The correct value (1 point).

**Grade 4
Math
Spring 2017 Item Release**

Question 4

Sample Responses

Sample Response: 1 point

What is the product of 24 and 13? Enter the number in the box.

312

←

→

↶

↷

✖

1

2

3

4

5

6

7

8

9

0

.

$\frac{\Box}{\Box}$

Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the product of 24 and 13.

- The student may use partial products to multiply 24 by 13.

$\begin{array}{r} 24 \\ \times 13 \\ \hline \end{array}$		$\begin{array}{r} 200 \\ 40 \\ 60 \\ + 12 \\ \hline 312 \end{array}$		$\begin{array}{r} 24 \\ \times 13 \\ \hline 312 \end{array}$
$12 = 3 \times 4$				
$60 = 3 \times 20$				
$40 = 10 \times 4$				
$200 = 10 \times 20$				

Sample Response: 1 point

What is the product of 24 and 13? Enter the number in the box.

312.0

← → ↶ ↷ ✕

1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the product of 24.0 and 13.

- The student may use the distributive property to multiply 24.0 by 13.

$$\begin{aligned} 24.0 \times 13 &= (20.0 \times 10) + (20.0 \times 3) + (4.0 \times 10) + (4.0 \times 3) \\ &= (200.0) + (60.0) + (40.0) + (12.0) \\ &= 312.0 \end{aligned}$$

$$24.0 \times 13 = 312.0$$

While decimals are introduced in the standards in grade 4, students are not expected to be able to multiply decimals until grade 5. A student can earn credit in grade 4 by identifying an equivalent value to a correct response.

Sample Response: 0 points

What is the product of 24 and 13? Enter the number in the box.

302

←

→

↶

↷

✕

1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the product of 24 and 13.

- The student may incorrectly use partial products to multiply 24 by 13.

$$\begin{array}{r} 24 \\ \times 13 \\ \hline 62 \\ 240 \\ \hline \end{array} \quad \begin{array}{r} 240 \\ + 62 \\ \hline 302 \end{array}$$

$$24 \times 13 \neq 302$$

Sample Response: 0 points

What is the product of 24 and 13? Enter the number in the box.

96

← → ↶ ↷ ✕

1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the product of 24 and 13.

- The student may incorrectly use the distributive property to multiply 24 by 13.

$$\begin{aligned} 24 \times 13 &\neq (24 \times 3) + (24 \times 1) \\ &= 72 + 24 \\ &= 96 \end{aligned}$$

$$24 \times 13 \neq 96$$

**Grade 4
Math
Spring 2017 Item Release**

Question 5

Question and Scoring Guidelines

Question 5

Which sum shows one way to express $1\frac{5}{6}$?

(A) $\frac{1}{6} + \frac{2}{6} + \frac{2}{6}$

(B) $\frac{1}{6} + \frac{5}{6} + \frac{6}{6}$

(C) $\frac{2}{6} + \frac{4}{6} + \frac{5}{6}$

(D) $\frac{5}{6} + \frac{5}{6} + \frac{5}{6}$

Points Possible: 1

Content Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

Content Standard: Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$.

b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples:* $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$; $\frac{3}{8} = \frac{1}{8} + \frac{2}{8}$; $2\frac{1}{8} = 1 + 1 + \frac{1}{8} = \frac{8}{8} + \frac{8}{8} + \frac{1}{8}$. (4.NF.3b)

Scoring Guidelines

Rationale for Option A: This is incorrect. The student may miss the whole part of the mixed number and choose a fraction decomposition for just the fraction part.

Rationale for Option B: This is incorrect. The student may think that because this decomposition includes 1, 5 and 6, it is equal to $1\frac{5}{6}$.

Rationale for Option C: **Key** – The student correctly identifies that $1\frac{5}{6}$ is equivalent to $\frac{11}{6}$ and chooses the decomposition that is equal to $\frac{11}{6}$.

Rationale for Option D: This is incorrect. The student may think that $1\frac{5}{6} = \frac{15}{6}$ and choose the decomposition that equals $\frac{15}{6}$.

Sample Response: 1 point

Which sum shows one way to express $1\frac{5}{6}$?

☐ A $\frac{1}{6} + \frac{2}{6} + \frac{2}{6}$

☐ B $\frac{1}{6} + \frac{5}{6} + \frac{6}{6}$

☒ C $\frac{2}{6} + \frac{4}{6} + \frac{5}{6}$

☐ D $\frac{5}{6} + \frac{5}{6} + \frac{5}{6}$

**Grade 4
Math
Spring 2017 Item Release**

Question 6

Question and Scoring Guidelines

Question 6

A pattern is shown.

2	3	5	9	17	?
---	---	---	---	----	---

A. What is the next number in the pattern?

B. Explain your thinking.

Type your answer in the space given.

Points Possible: 1

Content Cluster: Generate and analyze patterns.

Content Standard: Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way. (4.OA.5)*

Scoring Guidelines

Exemplar Response

- A. 33
- B. To get the next number you multiply the difference of the last two numbers by 2 and add that to the number.

Score Point

1 point

Description

Response includes the following correct next terms with a correct explanation:

Next Term:

- a) 33

Explanation: Any correct response that shows work, for example:

- b) $a_{n+1} = a_n + 2 \times (a_n - a_{n-1})$
- c) For each step, you add 2 times what you added the last time.
- d) For each step, you multiply the last number by 2 and subtract 1.
- e) To get from the first number to the second number, I add 1. To get from the second number to the third number, I add 2. To get from the third number to the fourth number, I add 4. To get from the fourth number to the fifth number, I add 8. Continuing this pattern, to get from the fifth number to the sixth number, I add 16.

0 points

The response does not meet the criteria required to earn one point. The response indicates inadequate or no understanding of the task and/or the idea or concept needed to answer the item. It may only repeat information given in the test item. The response may provide an incorrect solution/response and the provided supportive information may be irrelevant to the item, or possibly, no other information is shown. The student may have written on a different topic or written, "I don't know."

**Grade 4
Math
Spring 2017 Item Release**

Question 6

Sample Responses

Sample Response: 1 point

A pattern is shown.

2	3	5	9	17	?
---	---	---	---	----	---

A. What is the next number in the pattern?

B. Explain your thinking.

Type your answer in the space given.

33 because 2 to 3=1 and 3 to 5=2 and 5 to 9=4 and 9 to 17=8 the rule is double the rule before, ($1 \times 2 = 2$, $2 \times 2 = 4$, $4 \times 2 = 8$ so $8 \times 2 = 16$).

Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the next number in the pattern and provides a correct explanation.

Students are awarded credit based on their mathematical reasoning and computation(s) even though some responses may contain minor grammatical or spelling errors.

Sample Response: 1 point

A pattern is shown.

2	3	5	9	17	?
---	---	---	---	----	---

A. What is the next number in the pattern?

B. Explain your thinking.

Type your answer in the space given.

The next number in the pattern is going to be 33 because it starts with two and then it adds one and then it equals three then it doubles the one into two and then it is five then they doubled the two and then it is four so it's nine and then they doubled the four into an eight and then it becomes 17 and finally they doubled the eight into 16 and $16+17=33$.

Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the next number in the pattern and provides a correct explanation.

Students are awarded credit based on their mathematical reasoning and computation(s) even though some responses may contain minor grammatical or spelling errors.

Sample Response: 1 point

A pattern is shown.

2	3	5	9	17	?
---	---	---	---	----	---

A. What is the next number in the pattern?

B. Explain your thinking.

Type your answer in the space given.

The next number in the pattern 33. The pattern is $2 \times 4 = 8 - 1 = 7$ (for example). $2 \times 2 = 4 - 1 = 3$. $17 \times 2 = 34$, but $34 - 1 = 33$. That is how one can get their answer.

Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the next number in the pattern and provides a correct explanation.

Per the recommendation of the Range Finding Committee, this response earned full credit because students at this grade level may not recognize run-on equations as an incorrect form of an equation. The Committee recommended this response as the minimum acceptable for full credit.

Sample Response: 1 point

A pattern is shown.

2	3	5	9	17	?
---	---	---	---	----	---

A. What is the next number in the pattern?

B. Explain your thinking.

Type your answer in the space given.

$2+1=3$ $3+2=5$ $5+4=9$ $9+8=17$ $17+16=x$ $x=33$

Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the next number in the pattern and provides a correct explanation.

Students are awarded credit based on their mathematical reasoning and computation(s) even though some responses may contain minor grammatical or spelling errors.

Sample Response: 0 points

A pattern is shown.

2	3	5	9	17	?
---	---	---	---	----	---

A. What is the next number in the pattern?

B. Explain your thinking.

Type your answer in the space given.

The number that is missing is the number 19 because it the pattern shipd number and it same up 19.

Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the next number in the pattern and provides an incorrect explanation.

- The student may think that the pattern for the amount the number increases repeats instead of continuing.

Sample Response: 0 points

A pattern is shown.

2	3	5	9	17	?
---	---	---	---	----	---

A. What is the next number in the pattern?

B. Explain your thinking.

Type your answer in the space given.

I think that the next number might be 19 or 20 because the pattern is 2,3,5,9,17, and 20 or 19. the number could be higher or lower is could be 19, or 20.

Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the next number in the pattern and provides an incorrect explanation.

- The student is unable to identify and extend the pattern.

Sample Response: 0 points

A pattern is shown.

2	3	5	9	17	?
---	---	---	---	----	---

A. What is the next number in the pattern?

B. Explain your thinking.

Type your answer in the space given.

i think it going to subtract 1 but give two up or whatever

Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the next number in the pattern and provides an incorrect explanation.

- The student is unable to identify and extend the pattern.

**Grade 4
Math
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Question 7

Question and Scoring Guidelines

Question 7

Enter a number that rounds to 2,000 when rounded to the nearest thousand.

← → ↶ ↷ ✕

1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Points Possible: 1

Content Cluster: Generalize place value understanding for multi-digit whole numbers.

Content Standard: Use place value understanding to round multi-digit whole numbers to any place. (4.NBT.3)

Scoring Guidelines

Exemplar Response

- 2,100

Other Correct Responses

- Any number greater than or equal to 1,500 and less than or equal to 2,500

For this item, a full-credit response includes:

- A correct number (1 point).

**Grade 4
Math
Spring 2017 Item Release**

Question 7

Sample Responses

Sample Response: 1 point

Enter a number that rounds to 2,000 when rounded to the nearest thousand.

1600

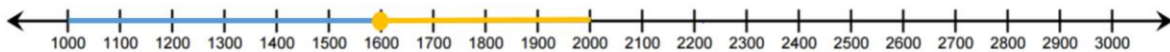
← → ↶ ↷ ✕

1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns full credit (1 point) because it identifies a correct number that rounds to 2,000 when rounding to the nearest thousand.

- The student may create a number line to identify his or her number and to recognize that 1,600 is closer to 2,000 than it is to 1,000.



Sample Response: 1 point

Enter a number that rounds to 2,000 when rounded to the nearest thousand.

2400

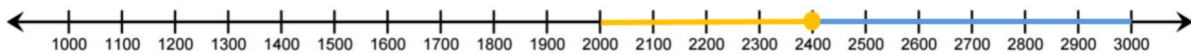
← → ↶ ↷ ✕

1	2	3
4	5	6
7	8	9
0	.	$\frac{\square}{\square}$

Notes on Scoring

This response earns full credit (1 point) because it identifies a correct number that rounds to 2,000 when rounding to the nearest thousand.

- The student may create a number line to identify his or her number and to recognize that 2,400 is closer to 2,000 than it is to 3,000.



Sample Response: 0 points

Enter a number that rounds to 2,000 when rounded to the nearest thousand.

1456

← → ↶ ↷ ✕

1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns no credit (0 points) because it identifies an incorrect number that rounds to 2,000 when rounding to the nearest thousand.

- The student may round 1,456 up to the nearest hundred and then round 1,500 up to 2,000.

Sample Response: 0 points

Enter a number that rounds to 2,000 when rounded to the nearest thousand.

1423

← → ↶ ↷ ✕

1	2	3
4	5	6
7	8	9
0	.	$\frac{\square}{\square}$

Notes on Scoring

This response earns no credit (0 points) because it identifies an incorrect number that rounds to 2,000 when rounding to the nearest thousand.

- The student may create a number line to identify his or her number and misidentify 1,423 as being closer to 2,000, when it is actually closer to 1,000.



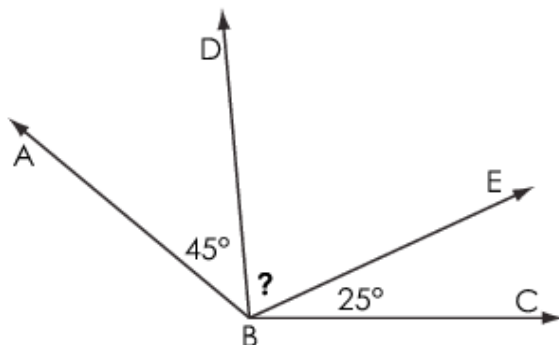
**Grade 4
Math
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Question 8

Question and Scoring Guidelines

Question 8

Angle ABC is made up of three smaller angles, as shown. The measure of angle ABC is 140° .



What is the measure, in degrees, of angle DBE? Enter the number in the box.

degrees



1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Points Possible: 1

Content Cluster: Geometric measurement: understand concepts of angle and measure angles.

Content Standard: Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure. (4.MD.7)

Scoring Guidelines

Exemplar Response

- 70 degrees

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- The correct number (1 point).

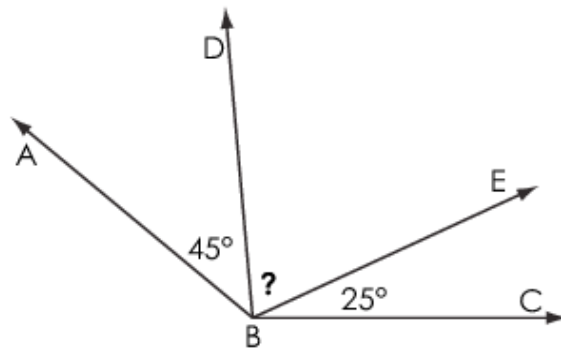
**Grade 4
Math
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Question 8

Sample Responses

Sample Response: 1 point

Angle ABC is made up of three smaller angles, as shown. The measure of angle ABC is 140° .



What is the measure, in degrees, of angle DBE? Enter the number in the box.

degrees



1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns full credit (1 point) because it identifies a correct measure of $\angle DBE$.

- The student may use the relationship between addition and subtraction to identify the measure of $\angle DBE$.

$$\angle ABC = 140^\circ; \angle ABD = 45^\circ; \angle EBC = 25^\circ; \angle DBE = \Box$$

$$45^\circ + \Box + 25^\circ = 140^\circ$$

$$45^\circ + 25^\circ + \Box = 140^\circ$$

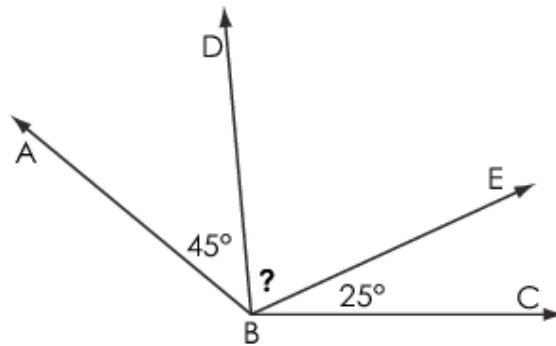
$$70^\circ + \Box = 140^\circ$$

$$\Box = 140^\circ - 70^\circ$$

$$\Box = 70^\circ$$

Sample Response: 1 point

Angle ABC is made up of three smaller angles, as shown. The measure of angle ABC is 140° .



What is the measure, in degrees, of angle DBE? Enter the number in the box.

degrees

← → ↶ ↷ ✕

1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns full credit (1 point) because it identifies a correct measure of $\angle DBE$.

- The student may use the relationship between addition and subtraction to identify the measure of $\angle DBE$.

$$\angle ABC = 140.0^\circ; \angle ABD = 45.0^\circ; \angle EBC = 25.0^\circ; \angle EBC = \Box$$

$$45.0^\circ + \Box + 25.0^\circ = 140.0^\circ$$

$$45.0^\circ + 25.0^\circ + \Box = 140.0^\circ$$

$$70.0^\circ + \Box = 140.0^\circ$$

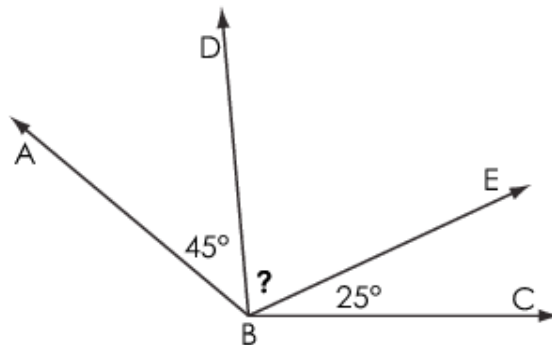
$$\Box = 140.0^\circ - 70.0^\circ$$

$$\Box = 70.0^\circ$$

While decimals are introduced in the standards in grade 4, students are not expected to be able to perform operations with decimals until grade 5. A student can earn credit in grade 4 by identifying an equivalent value to a correct response.

Sample Response: 0 points

Angle ABC is made up of three smaller angles, as shown. The measure of angle ABC is 140° .



What is the measure, in degrees, of angle DBE? Enter the number in the box.

80

degrees

Calculator interface showing a numeric keypad with digits 1-9, 0, a decimal point, and a fraction template button. Navigation buttons (left, right, undo, redo, and clear) are visible at the top.

Notes on Scoring

This response earns no credit (0 points) because it identifies an incorrect measure of $\angle DBE$.

- The student may incorrectly use the relationship between addition and subtraction to identify the measure of $\angle DBE$.

$$\angle ABC = 140^\circ; \angle ABD = 45^\circ; \angle EBC = 25^\circ; \angle EBC = \square$$

$$45^\circ + \square + 25^\circ = 140^\circ$$

$$45^\circ + 25^\circ + \square = 140^\circ$$

$$45^\circ + 25^\circ \neq 60^\circ$$

$$60^\circ + \square = 140^\circ$$

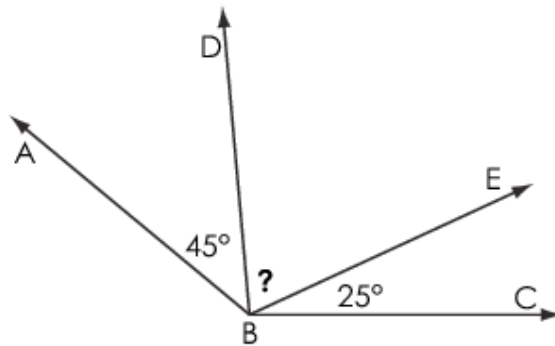
$$\square = 140^\circ - 60^\circ$$

$$\square = 80^\circ$$

Measure of $\angle EBC \neq 80^\circ$

Sample Response: 0 points

Angle ABC is made up of three smaller angles, as shown. The measure of angle ABC is 140° .



What is the measure, in degrees, of angle DBE? Enter the number in the box.

degrees



1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns no credit (0 points) because it identifies an incorrect measure of $\angle DBE$.

- The student may incorrectly identify the measure of $\angle ABC$ as 180° instead of 140° .

$$\angle ABC \neq 180^\circ; \angle ABD = 45^\circ; \angle EBC = 25^\circ; \angle EBC = \Box$$

$$45^\circ + \Box + 25^\circ = 180^\circ$$

$$45^\circ + 25^\circ + \Box = 180^\circ$$

$$70^\circ + \Box = 180^\circ$$

$$\Box = 180^\circ - 70^\circ$$

$$\Box = 110^\circ$$

Measure of $\angle EBC \neq 110^\circ$

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Question 9

Question and Scoring Guidelines

Question 9

Ms. Miller has 4 packs of pencils with 10 pencils in each pack. There are 32 students in Ms. Miller's class. She gives each student 1 pencil.

How many pencils does Ms. Miller have left over? Enter the number in the box.

← → ↶ ↷ ✕

1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Points Possible: 1

Content Cluster: Use the four operations with whole numbers to solve problems.

Content Standard: Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (4.OA.3)

Scoring Guidelines

Exemplar Response

- 8

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- A correct value (1 point).

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Math
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Question 9

Sample Responses

Sample Response: 1 point

Ms. Miller has 4 packs of pencils with 10 pencils in each pack. There are 32 students in Ms. Miller's class. She gives each student 1 pencil.

How many pencils does Ms. Miller have left over? Enter the number in the box.

8

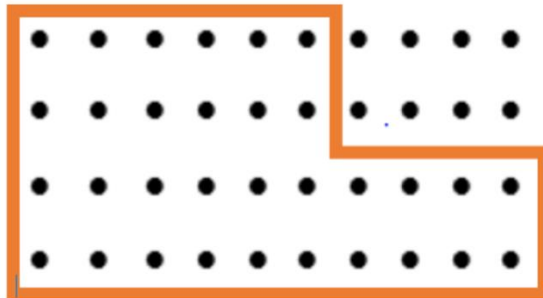


1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns full credit (1 point) because it identifies the correct number of pencils Ms. Miller has left over.

- The student may use an array to develop and model his or her mathematical thinking.



• = 1 pencil

$$4 \times 10 = 40 \text{ pencils}$$

$$40 - 32 = 8 \text{ pencils}$$

Sample Response: 1 point

Ms. Miller has 4 packs of pencils with 10 pencils in each pack. There are 32 students in Ms. Miller's class. She gives each student 1 pencil.

How many pencils does Ms. Miller have left over? Enter the number in the box.

8.0



1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns full credit (1 point) because it identifies the correct number of pencils Ms. Miller has left over.

- The student may solve the problem using multiplication and subtraction.

$$4.0 \times 10 = 40.0$$

$$40.0 - 32.0 = 8.0$$

While decimals are introduced in the standards in grade 4, students are not expected to be able to perform operations with decimals until grade 5. A student can earn credit in grade 4 by identifying an equivalent value to a correct response.

Sample Response: 0 points

Ms. Miller has 4 packs of pencils with 10 pencils in each pack. There are 32 students in Ms. Miller's class. She gives each student 1 pencil.

How many pencils does Ms. Miller have left over? Enter the number in the box.

7

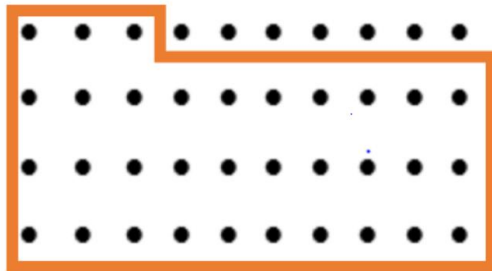


1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect number of pencils Ms. Miller has left over.

- The student may use an array to develop and model his or her mathematical thinking and then incorrectly subtract the number of pencils Ms. Miller gave each student.



• = 1 pencil

$$4 \times 10 = 40 \text{ pencils}$$

$$40 - 32 \neq 7 \text{ pencils}$$

Sample Response: 0 points

Ms. Miller has 4 packs of pencils with 10 pencils in each pack. There are 32 students in Ms. Miller's class. She gives each student 1 pencil.

How many pencils does Ms. Miller have left over? Enter the number in the box.

18



1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect number of pencils Ms. Miller has left over.

- The student may incorrectly multiply 5 packs instead of 4 to find the number of pencils Ms. Miller has before she hands pencils out.
 $5 \times 10 = 50$
 $50 - 32 = 18$

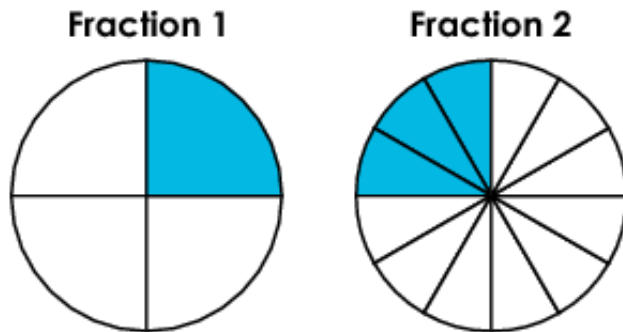
**Grade 4
Math
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Question 10

Question and Scoring Guidelines

Question 10

Models of two equivalent fractions are shown.



Which statement describes how Fraction 2 can be created from Fraction 1?

- Ⓐ Add 3 to the numerator only.
- Ⓑ Multiply only the numerator by 3.
- Ⓒ Add 3 to the numerator, and add 3 to the denominator.
- Ⓓ Multiply the numerator by 3, and multiply the denominator by 3.

Points Possible: 1

Content Cluster: Extend understanding of fraction equivalence and ordering.

Content Standard: Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{(n \times a)}{(n \times b)}$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. (4.NF.1)

Scoring Guidelines

Rationale for Option A: This is incorrect. The student may think that it is only necessary to add to the numerator.

Rationale for Option B: This is incorrect. The student may think that it is only necessary to multiply the numerator.

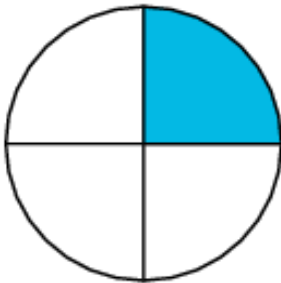
Rationale for Option C: This is incorrect. The student may think that adding the same number to the numerator and the denominator will yield an equivalent fraction.

Rationale for Option D: **Key** – The student correctly identifies that multiplying a fraction by a fraction equivalent to 1 will result in an equivalent fraction.

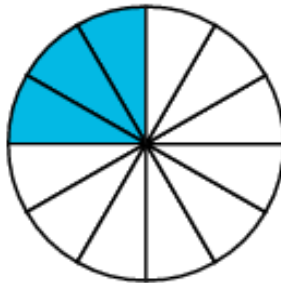
Sample Response: 1 point

Models of two equivalent fractions are shown.

Fraction 1



Fraction 2



Which statement describes how Fraction 2 can be created from Fraction 1?

- ☐ (A) Add 3 to the numerator only.
- ☐ (B) Multiply only the numerator by 3.
- ☐ (C) Add 3 to the numerator, and add 3 to the denominator.
- ☒ (D) Multiply the numerator by 3, and multiply the denominator by 3.

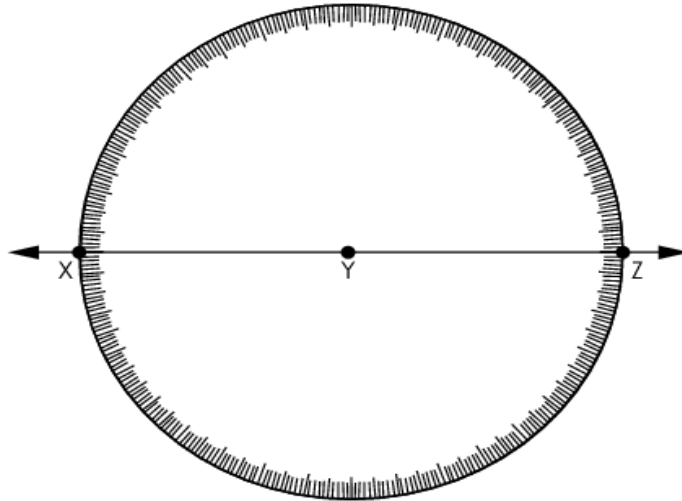
**Grade 4
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Question 11

Question and Scoring Guidelines

Question 11

In the circle diagram shown, point Y is at the center of the circle.



What is the measure, in degrees, of angle XYZ? Enter the number in the box.

degrees

←	→	↶	↷	✕
1	2	3		
4	5	6		
7	8	9		
0	.	$\frac{\Box}{\Box}$		

Points Possible: 1

Content Cluster: Geometric measurement: understand concepts of angle and measure angles.

Content Standard: Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees. (4.MD.5b)

Scoring Guidelines

Exemplar Response

- 180

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- A correct value (1 point).

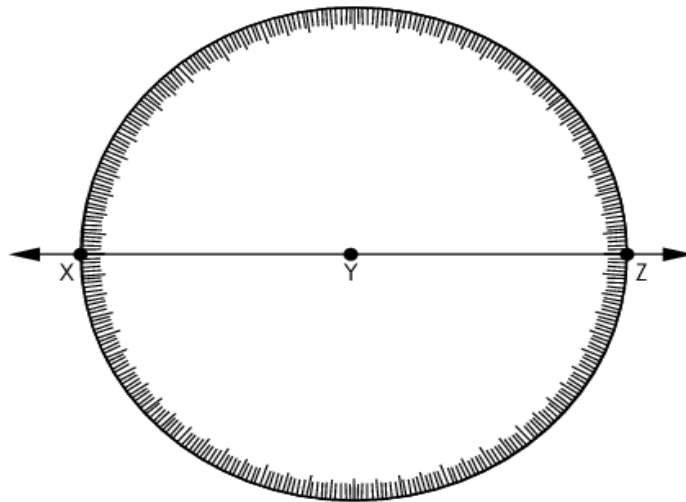
**Grade 4
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Question 11

Sample Responses

Sample Response: 1 point

In the circle diagram shown, point Y is at the center of the circle.



What is the measure, in degrees, of angle XYZ? Enter the number in the box.

degrees

←	→	↶	↷	✖
1	2	3		
4	5	6		
7	8	9		
0	.	$\frac{\Box}{\Box}$		

Notes on Scoring

This response earns full credit (1 point) because it identifies the correct measure, in degrees, of angle XYZ.

- The student may use reasoning about the number of degrees in a circle to identify the measure of the angle.

The first sentence states, "the figure is a circle".

A circle is 360° .

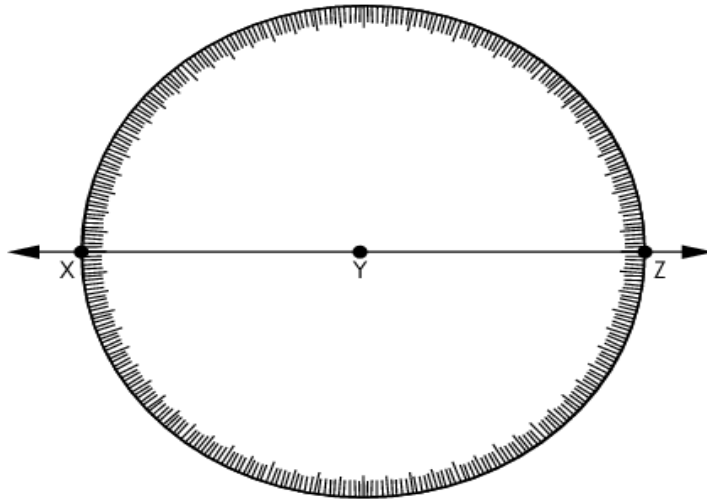
$\angle XYZ$ splits the circle in half.

Half of 360° is 180°

The measure of $\angle XYZ$ is 180°

Sample Response: 0 points

In the circle diagram shown, point Y is at the center of the circle.



What is the measure, in degrees, of angle XYZ? Enter the number in the box.

degrees

← → ↶ ↷ ✕

1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect measure, in degrees, of angle XYZ.

- The student may use incorrect reasoning about the number of degrees in a circle to identify the measure of the angle.

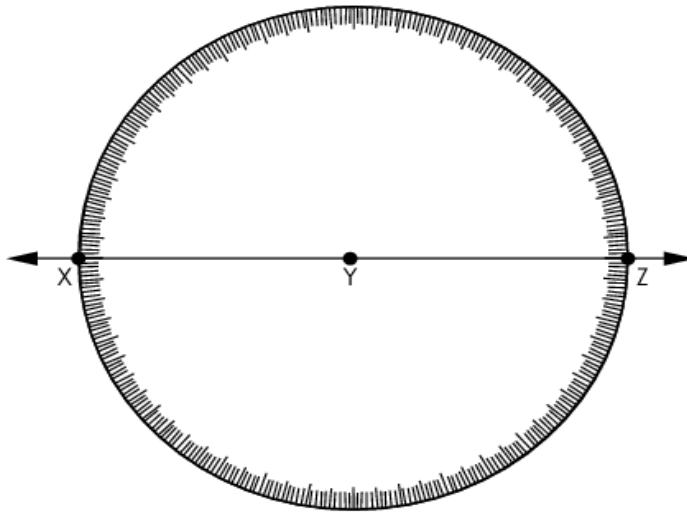
$\angle XYZ$ splits the circle in half.

Half of 180° is 90°

The measure of $\angle XYZ$ is 90°

Sample Response: 0 points

In the circle diagram shown, point Y is at the center of the circle.



What is the measure, in degrees, of angle XYZ? Enter the number in the box.

degrees

←	→	↶	↷	✖
1	2	3		
4	5	6		
7	8	9		
0	.	$\frac{\Box}{\Box}$		

Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect measure, in degrees, of angle XYZ.

- The student may think that he or she only needs to identify the number of degrees in the circle.

The first sentence states, "the figure is a circle".
A circle is 360° .

**Grade 4
Math
Spring 2017 Item Release**

Question 12

Question and Scoring Guidelines

Question 12

A worker has 32 screwdrivers to put into tool kits.

A. How many tool kits can the worker make if he puts 6 screwdrivers into each tool kit? Enter the number in the first box.

B. How many screwdrivers will be left over after the worker makes the tool kits? Enter the number in the second box.

A.

B.

←

→

↶

↷

✖

1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Points Possible: 2

Content Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic.

Content Standard: Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (4.NBT.6)

Scoring Guidelines

Exemplar Response

- A. 5
- B. 2

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- A correct value for A (1 point)
AND
- A correct value for B (1 point).

**Grade 4
Math
Spring 2017 Item Release**

Question 12

Sample Responses

Sample Response: 2 points

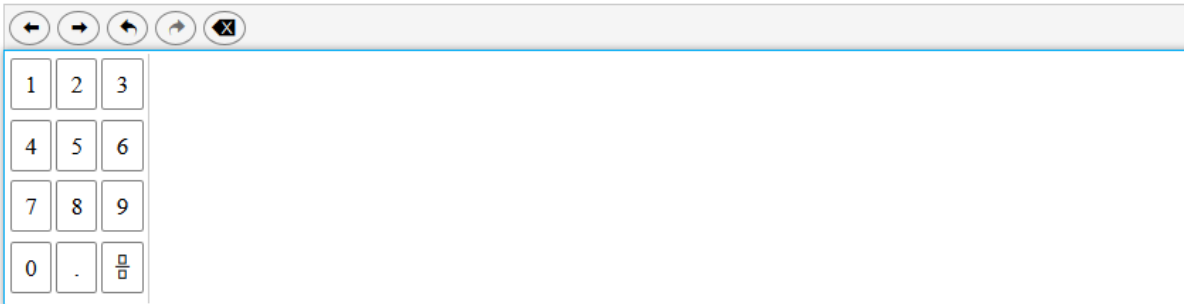
A worker has 32 screwdrivers to put into tool kits.

A. How many tool kits can the worker make if he puts 6 screwdrivers into each tool kit? Enter the number in the first box.

B. How many screwdrivers will be left over after the worker makes the tool kits? Enter the number in the second box.

A. 5

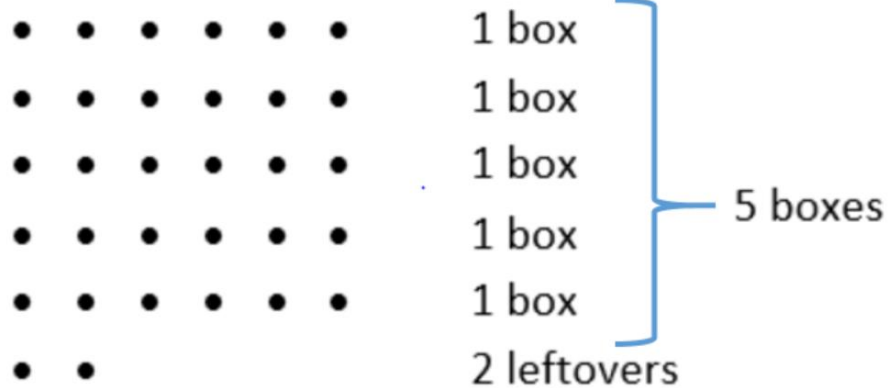
B. 2



Notes on Scoring

This response earns full credit (2 points) because it identifies the correct number of screwdrivers in both boxes.

- The student may use an array to develop and model his or her mathematical thinking.



Sample Response: 2 points

A worker has 32 screwdrivers to put into tool kits.

A. How many tool kits can the worker make if he puts 6 screwdrivers into each tool kit? Enter the number in the first box.

B. How many screwdrivers will be left over after the worker makes the tool kits? Enter the number in the second box.

A. 5.0

B. 2.0

Notes on Scoring

This response earns full credit (2 points) because it identifies the correct number of screwdrivers in both boxes.

- The student may solve the problem using multiplication and subtraction.

$$5.0 \times 6 = 30.0$$

$$32.0 - 30.0 = 2.0$$

While decimals are introduced in the standards in grade 4, students are not expected to be able to perform operations with decimals until grade 5. A student can earn credit in grade 4 by identifying an equivalent value to a correct response.

Sample Response: 1 point

A worker has 32 screwdrivers to put into tool kits.

A. How many tool kits can the worker make if he puts 6 screwdrivers into each tool kit? Enter the number in the first box.

B. How many screwdrivers will be left over after the worker makes the tool kits? Enter the number in the second box.

A. 6

B. 2

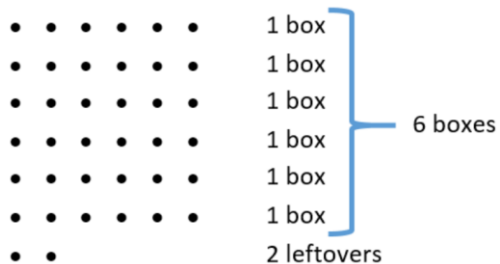


1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns partial credit (1 point) because it identifies the incorrect number of boxes of screwdrivers but the correct number of left-over screwdrivers.

- The student may use an array to develop and model his or her mathematical thinking.



Sample Response: 1 point

A worker has 32 screwdrivers to put into tool kits.

A. How many tool kits can the worker make if he puts 6 screwdrivers into each tool kit? Enter the number in the first box.

B. How many screwdrivers will be left over after the worker makes the tool kits? Enter the number in the second box.

A. 5

B. .2

Notes on Scoring

This response earns partial credit (1 point) because it identifies the correct number of boxes of screwdrivers but the incorrect number of left-over screwdrivers.

- The student may solve the problem using multiplication and subtraction.
 $5 \times 6 = 30$
 $32 - 30 \neq .2$

While decimals are introduced in the standards in grade 4, students are not expected to be able to perform operations with decimals until grade 5. A student can earn credit in grade 4 by identifying an equivalent value to a correct response.

Sample Response: 0 points

A worker has 32 screwdrivers to put into tool kits.

A. How many tool kits can the worker make if he puts 6 screwdrivers into each tool kit? Enter the number in the first box.

B. How many screwdrivers will be left over after the worker makes the tool kits? Enter the number in the second box.

A.

B.

←

→

↶

↷

✖

1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect number of boxes of screwdrivers and the incorrect number of left-over screwdrivers.

- The student may think that there are 36 screwdrivers to place into boxes instead of 32.

$$36 \div 6 = 6 \text{ boxes}$$

$$36 - 36 = 0 \text{ left over}$$

Sample Response: 0 points

A worker has 32 screwdrivers to put into tool kits.

A. How many tool kits can the worker make if he puts 6 screwdrivers into each tool kit? Enter the number in the first box.

B. How many screwdrivers will be left over after the worker makes the tool kits? Enter the number in the second box.

A. 6

B. 4



1	2	3
4	5	6
7	8	9
0	.	$\frac{\Box}{\Box}$

Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect number of boxes of screwdrivers and the incorrect number of left-over screwdrivers.

- The student may think that there are 36 screwdrivers to place into boxes and subtract 32 from 36 to identify the number left over.
 $36 \div 6 = 6$ boxes
 $36 - 32 = 4$ left over

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Math
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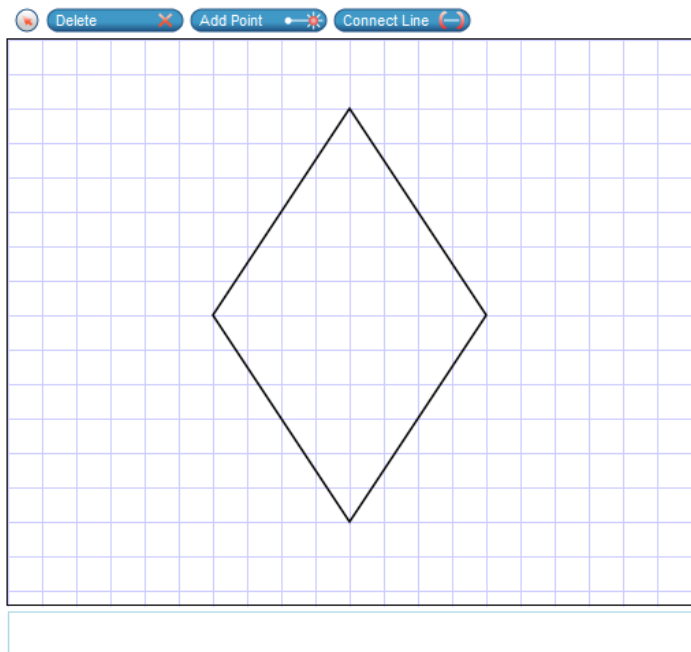
Question 13

Question and Scoring Guidelines

Question 13

A rhombus is shown.

Use the Connect Line tool to draw all of the lines of symmetry of the rhombus.



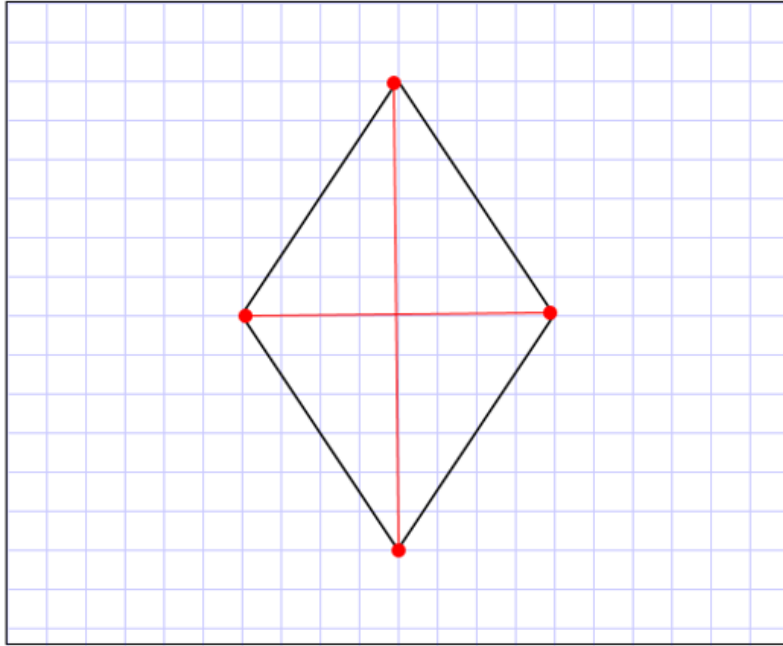
Points Possible: 1

Content Cluster: Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Content Standard: Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. (4.G.3)

Scoring Guidelines

Exemplar Response



Other Correct Responses

- N/A

For this item, a full-credit response includes:

- Two correct lines of symmetry (1 point).

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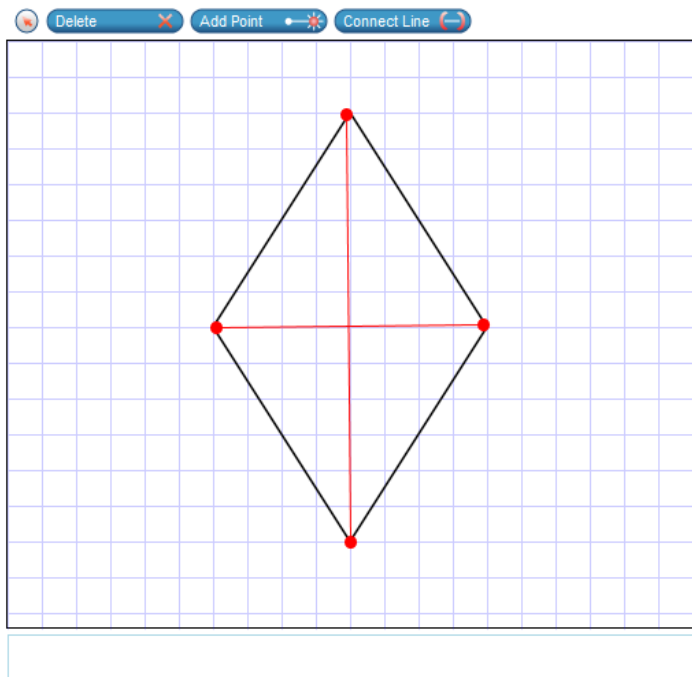
Question 13

Sample Responses

Sample Response: 1 point

A rhombus is shown.

Use the Connect Line tool to draw all of the lines of symmetry of the rhombus.



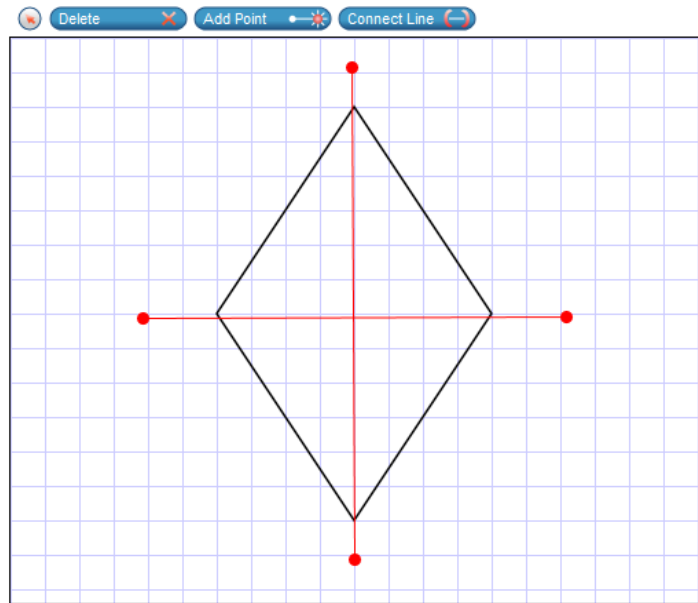
Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the lines of symmetry.

Sample Response: 1 point

A rhombus is shown.

Use the Connect Line tool to draw all of the lines of symmetry of the rhombus.



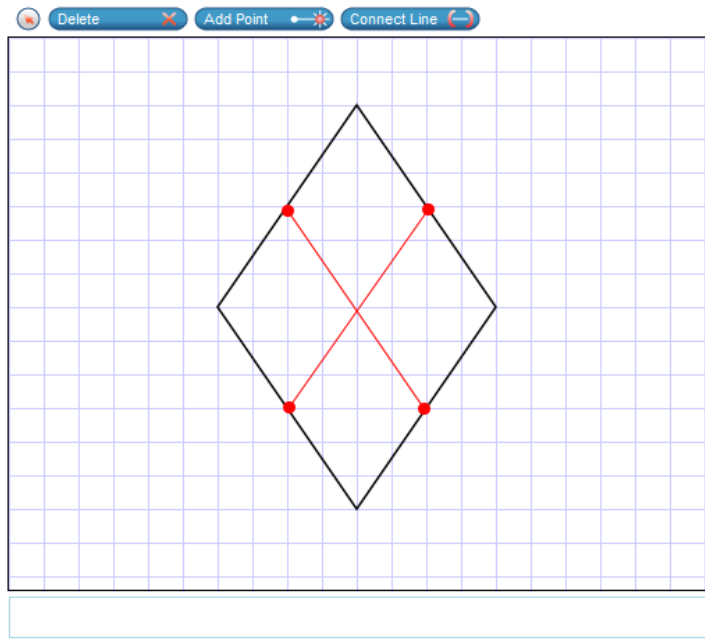
Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the lines of symmetry.

Sample Response: 0 points

A rhombus is shown.

Use the Connect Line tool to draw all of the lines of symmetry of the rhombus.



Notes on Scoring

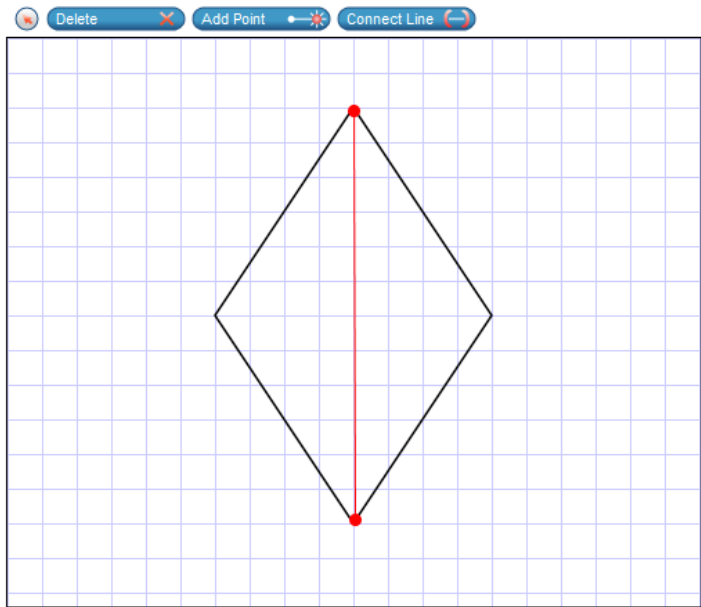
This response earns no credit (0 points) because it incorrectly identifies the lines of symmetry.

- The student may think that any lines drawn inside the rhombus are lines of symmetry.

Sample Response: 0 points

A rhombus is shown.

Use the Connect Line tool to draw all of the lines of symmetry of the rhombus.



Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the lines of symmetry.

- The student may think that a rhombus contains only one line of symmetry.

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Question 14

Question and Scoring Guidelines

Question 14

A red shirt costs 3 times as much as a black shirt. If a black shirt costs \$9, how much does a red shirt cost?

Select the **two** statements that can be used to represent the problem.

- ☐ 3 times 9 is 27.
- ☐ 3 times 27 is 9.
- ☐ 9 times 3 is 27.
- ☐ 9 times 27 is 3.
- ☐ 27 times 3 is 9.
- ☐ 27 times 9 is 3.

Points Possible: 1

Content Strand: Use the four operations with whole numbers to solve problems.

Content Standard: Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. (4.OA.1)

Scoring Guidelines

Rationale for First Option: **Key** – The student identifies a statement that describes the equation.

Rationale for Second Option: This is incorrect. The student may confuse a factor (9) with the product (27).

Rationale for Third Option: **Key** – The student identifies a statement that describes the equation.

Rationale for Fourth Option: This is incorrect. The student may confuse a factor (3) with the product (27).

Rationale for Fifth Option: This is incorrect. The student may confuse the product (27) with a factor (9).

Rationale for Sixth Option: This is incorrect. The student may confuse the product (27) with a factor (3).

Sample Response: 1 point

A red shirt costs 3 times as much as a black shirt. If a black shirt costs \$9, how much does a red shirt cost?

Select the **two** statements that can be used to represent the problem.

☒ 3 times 9 is 27.

☐ 3 times 27 is 9.

☒ 9 times 3 is 27.

☐ 9 times 27 is 3.

☐ 27 times 3 is 9.

☐ 27 times 9 is 3.

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Math
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Question 15

Question and Scoring Guidelines

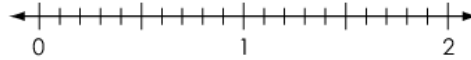
Question 15

Natalie and Wyatt are hiking. Natalie hikes for 1.5 miles and Wyatt hikes for 1.3 miles.

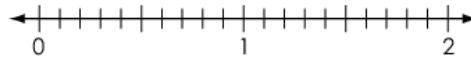
- A. Select a mark on each number line to show the distances, in miles, that Natalie and Wyatt hike.
- B. Select the symbol that completes the comparison for Natalie's and Wyatt's hikes.

A.

Natalie's Hike (miles)



Wyatt's Hike (miles)



B.

Distance Natalie Hikes Distance Wyatt Hikes



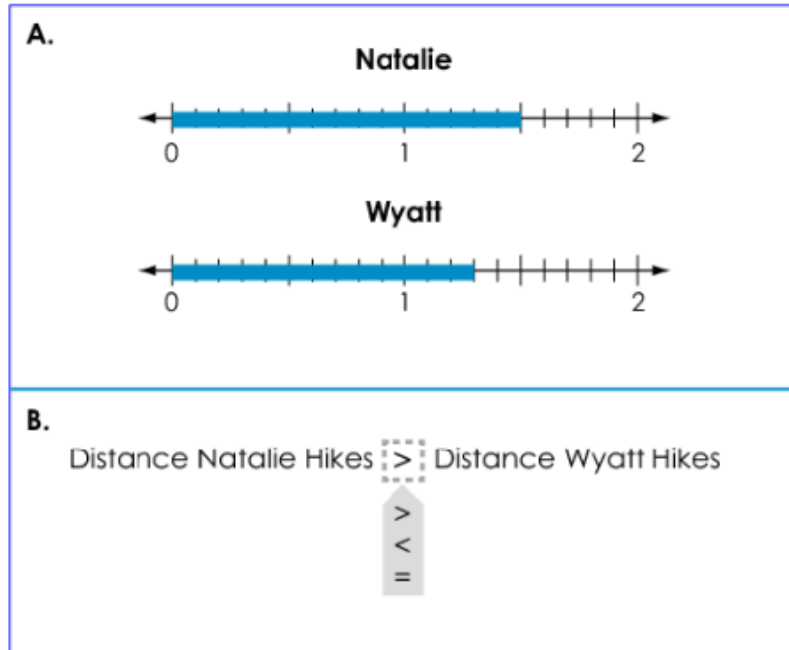
Points Possible: 2

Content Cluster: Understand decimal notation for fractions, and compare decimal fractions.

Content Standard: Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model. (4.NF.7)

Scoring Guidelines

Exemplar Response



Other Correct Responses

- N/A

For this item, a full-credit (2 point) response includes:

- Two correct number lines in Part A (1 point);
AND
- The correct symbol in Part B (1 point).

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Question 15

Sample Responses

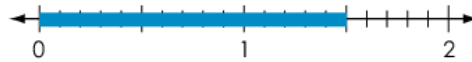
Sample Response: 2 points

Natalie and Wyatt are hiking. Natalie hikes for 1.5 miles and Wyatt hikes for 1.3 miles.

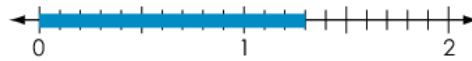
- A. Select a mark on each number line to show the distances, in miles, that Natalie and Wyatt hike.
- B. Select the symbol that completes the comparison for Natalie's and Wyatt's hikes.

A.

Natalie's Hike (miles)



Wyatt's Hike (miles)



B.

Distance Natalie Hikes Distance Wyatt Hikes



Notes on Scoring

This response earns full credit (2 points) because it creates a correct number line to represent the distance, in miles, that Wyatt and Natalie hike in Part A, and it selects the correct symbol to use to create a correct comparison in Part B.

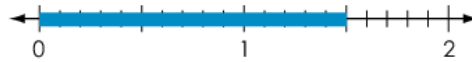
Sample Response: 1 point

Natalie and Wyatt are hiking. Natalie hikes for 1.5 miles and Wyatt hikes for 1.3 miles.

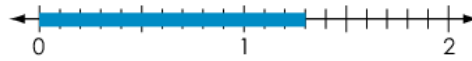
- A. Select a mark on each number line to show the distances, in miles, that Natalie and Wyatt hike.
- B. Select the symbol that completes the comparison for Natalie's and Wyatt's hikes.

A.

Natalie's Hike (miles)



Wyatt's Hike (miles)



B.

Distance Natalie Hikes Distance Wyatt Hikes



Notes on Scoring

This response earns partial credit (1 point) because it creates a correct number line to represent the distance, in miles, that Wyatt and Natalie hike in Part A, but it selects an incorrect symbol to use and thus creates an incorrect comparison in Part B.

- The student may think that Wyatt hikes more miles because Wyatt's number line is closer to 1 mile than Natalie's.

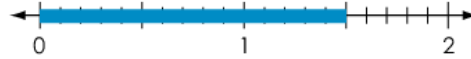
Sample Response: 1 point

Natalie and Wyatt are hiking. Natalie hikes for 1.5 miles and Wyatt hikes for 1.3 miles.

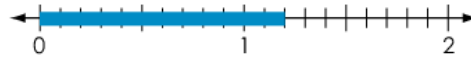
- A. Select a mark on each number line to show the distances, in miles, that Natalie and Wyatt hike.
- B. Select the symbol that completes the comparison for Natalie's and Wyatt's hikes.

A.

Natalie's Hike (miles)



Wyatt's Hike (miles)



B.

Distance Natalie Hikes Distance Wyatt Hikes



Notes on Scoring

This response earns partial credit (1 point) because it creates an incorrect number line to represent the distance, in miles, that Wyatt and Natalie hike in Part A, but it uses the correct symbol to use to create a correct comparison in Part B.

- The student may think that Wyatt hikes 1.2 miles instead of 1.3 miles.

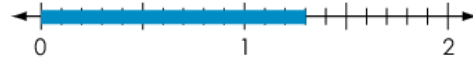
Sample Response: 0 points

Natalie and Wyatt are hiking. Natalie hikes for 1.5 miles and Wyatt hikes for 1.3 miles.

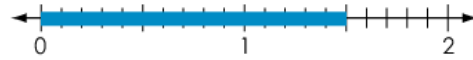
- A. Select a mark on each number line to show the distances, in miles, that Natalie and Wyatt hike.
- B. Select the symbol that completes the comparison for Natalie's and Wyatt's hikes.

A.

Natalie's Hike (miles)



Wyatt's Hike (miles)



B.

Distance Natalie Hikes Distance Wyatt Hikes



Notes on Scoring

This response earns no credit (0 points) because it creates an incorrect number line to represent the distance, in miles, that Wyatt and Natalie hike in Part A, and it selects an incorrect symbol to use and thus creates an incorrect comparison in Part B.

- The student creates both number lines incorrectly by switching the distances that Wyatt and Natalie hike.
- The student may create an incorrect comparison based on the distances that Wyatt and Natalie hike being switched on the number lines.

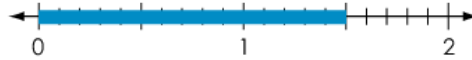
Sample Response: 0 points

Natalie and Wyatt are hiking. Natalie hikes for 1.5 miles and Wyatt hikes for 1.3 miles.

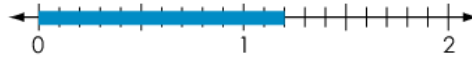
- A. Select a mark on each number line to show the distances, in miles, that Natalie and Wyatt hike.
- B. Select the symbol that completes the comparison for Natalie's and Wyatt's hikes.

A.

Natalie's Hike (miles)



Wyatt's Hike (miles)



B.

Distance Natalie Hikes Distance Wyatt Hikes



Notes on Scoring

This response earns no credit (0 points) because it creates an incorrect number line to represent the distance, in miles, that Wyatt and Natalie hike in Part A, and it selects an incorrect symbol to use and thus creates an incorrect comparison in Part B.

- The student creates an incorrect number line that shows Wyatt hiking 1.2 miles instead of 1.3 miles.
- The student may think that Wyatt hikes more miles because Wyatt's number line is closer to 1 mile than Natalie's.

**Grade 4
Math
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Question 16

Question and Scoring Guidelines

Question 16

Select the **two** correct representations of the number “one thousand, twenty five.”

- ☐ $1,000 + 20 + 5$
- ☐ $1,000 \times 20 \times 5$
- ☐ $1,000 + 200 + 5$
- ☐ 1,025
- ☐ 1,205
- ☐ 1,250

Points Possible: 1

Content Strand: Generalize place value understanding for multi-digit whole numbers.

Content Standard: Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons. (4.NBT.2)

Scoring Guidelines

Rationale for First Option: **Key** – The student correctly identifies the number in expanded form.

Rationale for Second Option: This is incorrect. The student may confuse addition and multiplication when working on expanded form.

Rationale for Third Option: This is incorrect. The student may mistake the place value of the middle number.

Rationale for Fourth Option: **Key** – The student correctly identifies the number in numerical form.

Rationale for Fifth Option: This is incorrect. The student may confuse the place values in numeric form.

Rationale for Sixth Option: This is incorrect. The student may confuse the place values in numeric form.

Sample Response: 1 point

Select the **two** correct representations of the number “one thousand, twenty five.”

- ☒ $1,000 + 20 + 5$
- ☐ $1,000 \times 20 \times 5$
- ☐ $1,000 + 200 + 5$
- ☒ 1,025
- ☐ 1,205
- ☐ 1,250

**Grade 4
Math
Spring 2017 Item Release**

Question 17

Question and Scoring Guidelines

Question 17

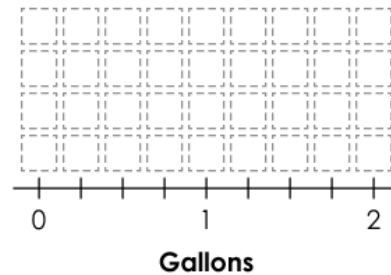
Five students water their plants. The table shows the amount of water used by each student.

Water Used by Students

Student	Amount of Water (gallons)
Ava	$\frac{1}{2}$ gallon
Emma	$\frac{1}{4}$ gallon less than Ava
Liam	The same amount as Emma
Jacob	$\frac{1}{2}$ gallon
Mia	$1\frac{1}{4}$ gallons more than Jacob

Select boxes above the number line to create a line plot that shows the water used by each student.

Water Used by Students



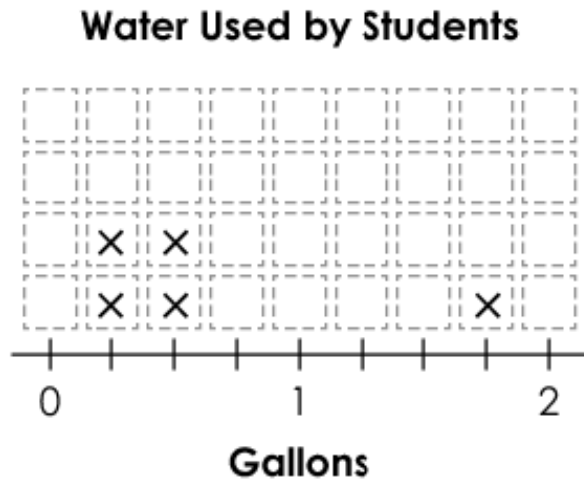
Points Possible: 1

Content Cluster: Represent and interpret data.

Content Standard: Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection. (4.MD.4)*

Scoring Guidelines

Exemplar Response



Other Correct Responses

- N/A

For this item, a full-credit response includes:

- A correct line plot (1 point).

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Question 17

Sample Responses

Sample Response: 1 point

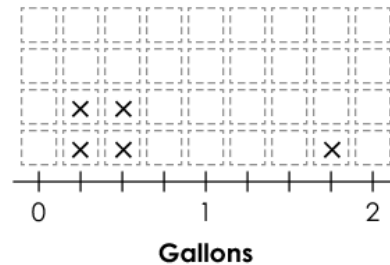
Five students water their plants. The table shows the amount of water used by each student.

Water Used by Students

Student	Amount of Water (gallons)
Ava	$\frac{1}{2}$ gallon
Emma	$\frac{1}{4}$ gallon less than Ava
Liam	The same amount as Emma
Jacob	$\frac{1}{2}$ gallon
Mia	$1\frac{1}{4}$ gallons more than Jacob

Select boxes above the number line to create a line plot that shows the water used by each student.

Water Used by Students

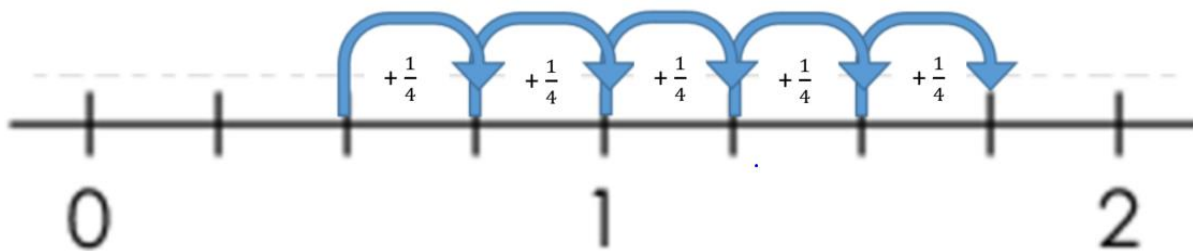


Notes on Scoring

This response earns full credit (1 point) because it creates a correct line plot that shows the water used by each student.

- The student may use the information in the table to plot the first four points on the line plot and use a strategy like counting on from Jacob's total to identify the amount of water Mia uses.

$$1\frac{1}{4} = \frac{5}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$$



Sample Response: 0 points

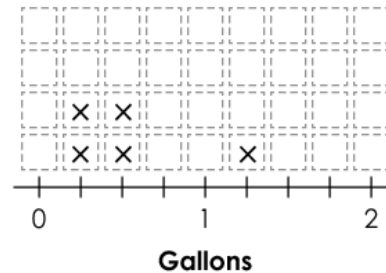
Five students water their plants. The table shows the amount of water used by each student.

Water Used by Students

Student	Amount of Water (gallons)
Ava	$\frac{1}{2}$ gallon
Emma	$\frac{1}{4}$ gallon less than Ava
Liam	The same amount as Emma
Jacob	$\frac{1}{2}$ gallon
Mia	$1\frac{1}{4}$ gallons more than Jacob

Select boxes above the number line to create a line plot that shows the water used by each student.

Water Used by Students



Notes on Scoring

This response earns no credit (0 points) because it creates an incorrect line plot that shows the water used by each student.

- The student may think that the amount of water Mia uses is $1\frac{1}{4}$ gallons rather than $1\frac{1}{4}$ gallons more than Jacob.

Sample Response: 0 points

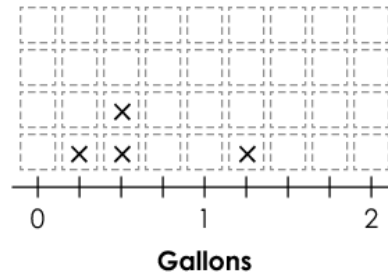
Five students water their plants. The table shows the amount of water used by each student.

Water Used by Students

Student	Amount of Water (gallons)
Ava	$\frac{1}{2}$ gallon
Emma	$\frac{1}{4}$ gallon less than Ava
Liam	The same amount as Emma
Jacob	$\frac{1}{2}$ gallon
Mia	$1\frac{1}{4}$ gallons more than Jacob

Select boxes above the number line to create a line plot that shows the water used by each student.

Water Used by Students



Notes on Scoring

This response earns no credit (0 points) because it creates an incorrect line plot that shows the water used by each student.

- The student may think that the amount of water Mia uses is $1\frac{1}{4}$ gallons total rather than $1\frac{1}{4}$ gallons more than Jacob, and the student may also think that he or she only needs to plot four data points instead of five.

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