Ohio | Department of Education

Ohio's State Tests

ITEM RELEASE

SPRING 2017

GRADE 5 MATHEMATICS

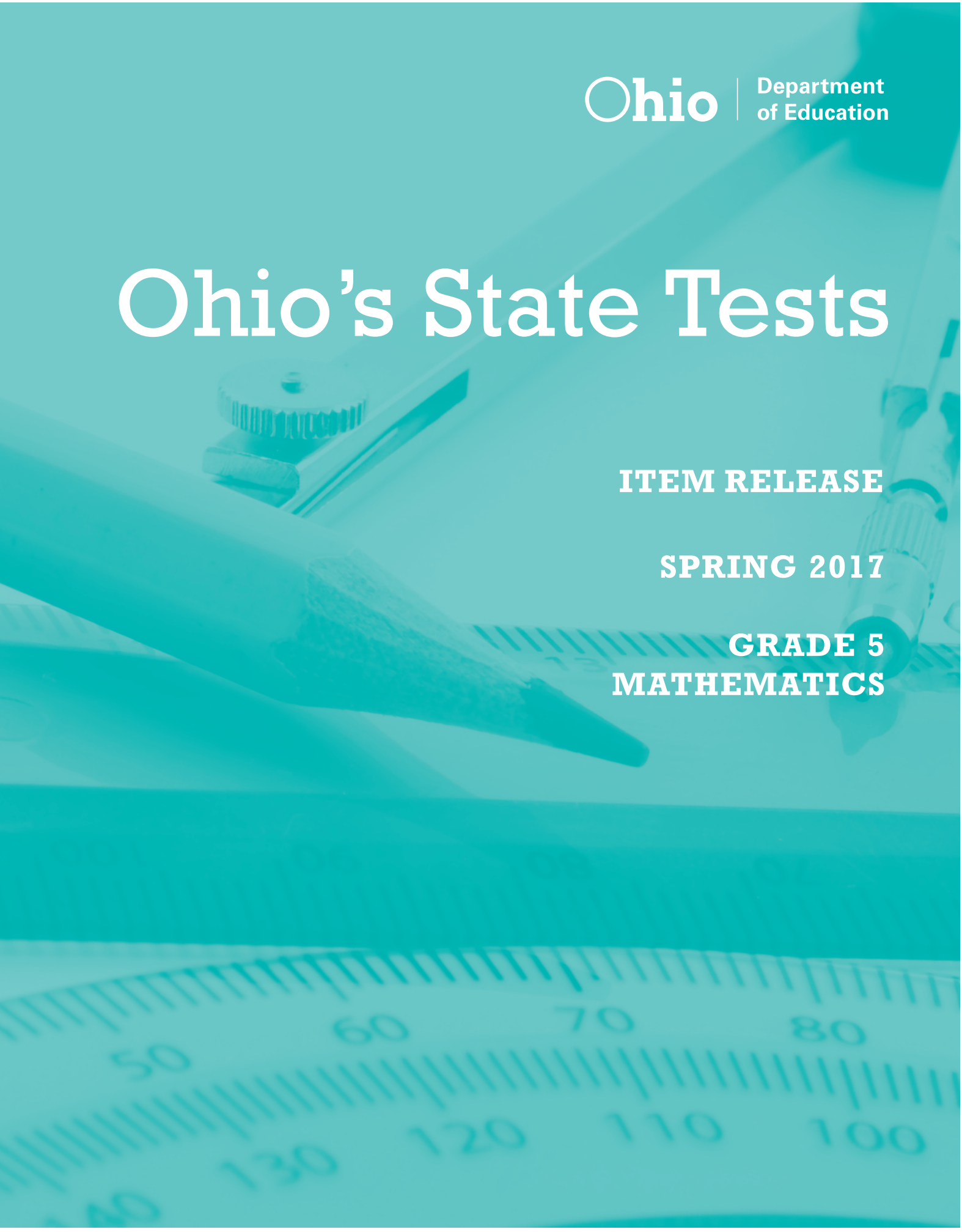

Table of Contents

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Spring 2017 Item Release
Content Summary and Answer Key

Question No.	Item Type	Content Cluster	Content Standard	Answer Key	Points
1	Equation Item	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. *a.* Interpret the product $(\frac{a}{b}) \times q$ as a parts of a partition of *q* into *b* equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show* $(\frac{2}{3}) \times 4 = \frac{8}{3}$*, and create a story context for this equation. Do the same with* $(\frac{2}{3}) \times (\frac{4}{5}) = \frac{8}{15}$*. (In general,* $(\frac{a}{b}) \times (\frac{c}{d}) = \frac{ac}{bd}$*.) (5.NF.4a)*	---	1 point
2	Multiple Choice	Understand the place value system.	Read, write, and compare decimals to thousandths. *a.* Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = $3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (\frac{1}{10}) + 9 \times (\frac{1}{100}) + 2 \times (\frac{1}{1000})$. *(5.NBT.3a)*	B	1 point
3	Equation Item	Use equivalent fractions as a strategy to add and subtract fractions.	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = (\frac{(ad+bc)}{bd})$. *(5.NF.1)*	---	1 point

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Question No.	Item Type	Content Cluster	Content Standard	Answer Key	Points
4	Multiple Choice	Write and interpret numerical expressions.	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product. *(5.OA.2)*	B	1 point
5	Multiple Choice	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *(5.NF.6)*	A	1 point
6	Equation Item	Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. (5.MD.4)	---	1 point

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Question No.	Item Type	Content Cluster	Content Standard	Answer Key	Points
7	Multi-Select Item	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	Interpret multiplication as scaling (resizing), by: *a.* Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. *(5.NF.5a)*	C, E	1 point
8	Matching Item	Understand the place value system.	Use place value understanding to round decimals to any place. *(5.NBT.4)*	---	1 point
9	Multiple Choice	Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.	Recognize volume as an attribute of solid figures and understand concepts of volume measurement. *b.* A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units. *(5.MD.3b)*	A	1 point
10	Multi-Select Item	Write and interpret numerical expressions.	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. *(5.OA.1)*	A, C, E	1 point

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Question No.	Item Type	Content Cluster	Content Standard	Answer Key	Points
11	Equation Item	Understand the place value system.	Read, write, and compare decimals to thousandths. *b.* Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. *(5.NBT.3b)*	---	1 point
12	Multiple Choice	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share $\frac{1}{2}$ lb of chocolate equally? How many $\frac{1}{3}$-cup servings are in 2 cups of raisins? *(5.NF.7c)*	A	1 point
13	Graphic Response Item	Graph points on the coordinate plane to solve real-world and mathematical problems.	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. *(5.G.2)*	---	1 point

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Question No.	Item Type	Content Cluster	Content Standard	Answer Key	Points
14	Equation Item	Analyze patterns and relationships.	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so. (5.OA.3)*	---	1 point
15	Multiple Choice	Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. *(5.MD.4)*	B	1 point
16	Equation Item	Understand the place value system.	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. *(5.NBT.2)*	---	1 point

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Question No.	Item Type	Content Cluster	Content Standard	Answer Key	Points
17	Table Item	Convert like measurement units within a given measurement system.	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. *(5.MD.1)*	---	1 point
18	Multi-Select Item	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. *b.* Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas. *(5.NF.4b)*	A, C, D	1 point
19	Multiple Choice	Perform operations with multi-digit whole numbers and with decimals to hundredths.	Find whole-number quotients of whole numbers with up to four-digit dividends and two-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. *(5.NBT.6)*	C	1 point

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Question No.	Item Type	Content Cluster	Content Standard	Answer Key	Points
20	Graphic Response Item	Classify two-dimensional figures into categories based on their properties.	Classify two-dimensional figures in a hierarchy based on properties. *(5.G.4)*	---	1 point

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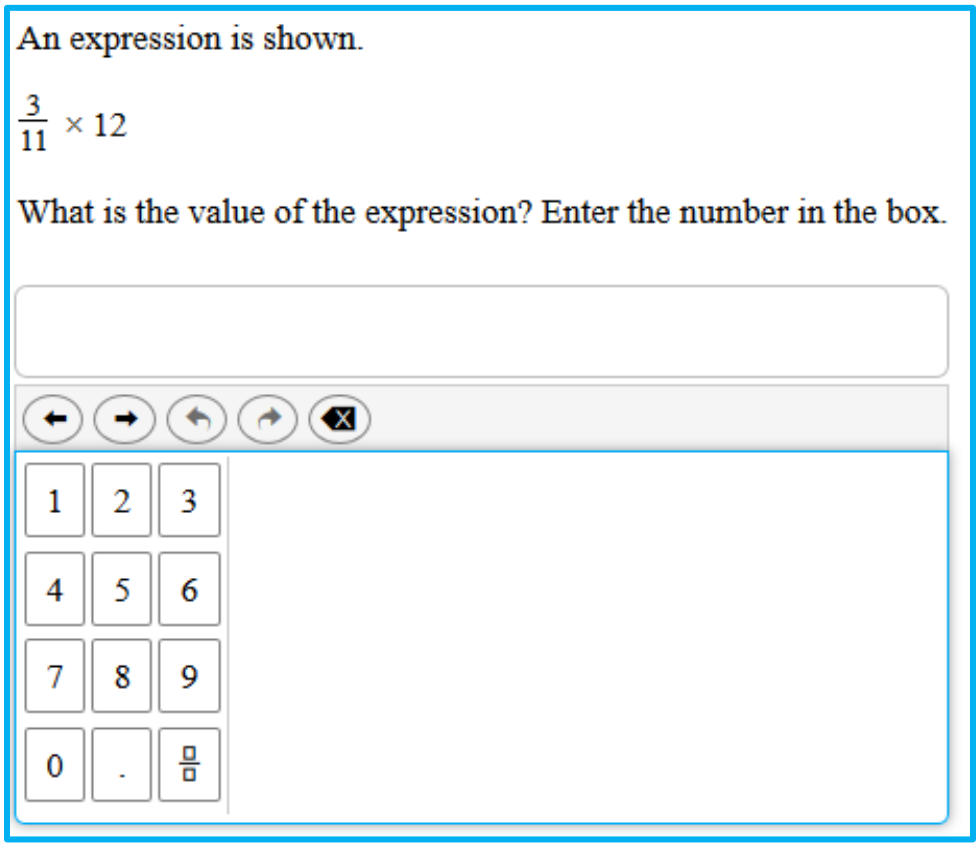
Question 1

Question and Scoring Guidelines

Question 1



Points Possible: 1

Content Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Content Standard: Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
a. Interpret the product $(\frac{a}{b}) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show* $(\frac{2}{3}) \times 4 = \frac{8}{3}$, *and create a story context for this equation. Do the same with* $(\frac{2}{3}) \times (\frac{4}{5}) = \frac{8}{15}$. *(In general,* $(\frac{a}{b}) \times (\frac{c}{d}) = \frac{ac}{bd}$.*) (5.NF.4a)*

Scoring Guidelines

Exemplar Response

- $\frac{36}{11}$

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- The correct value (1 point).

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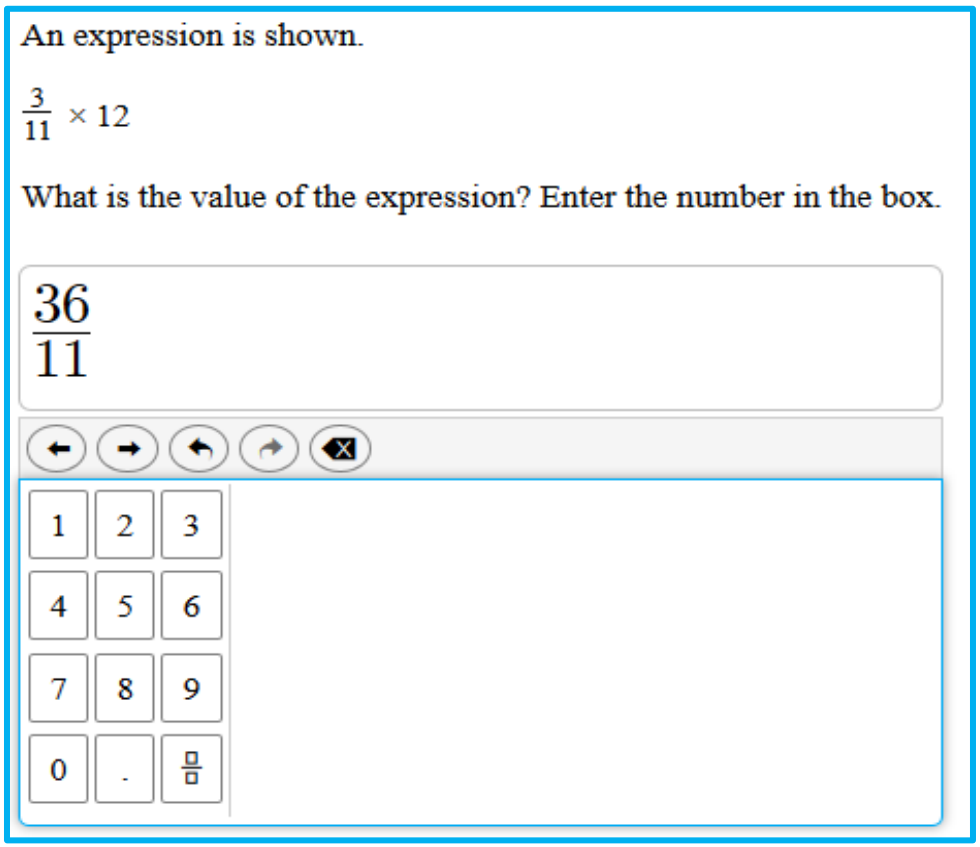
Question 1

Sample Responses

Sample Response: 1 point



Notes on Scoring

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

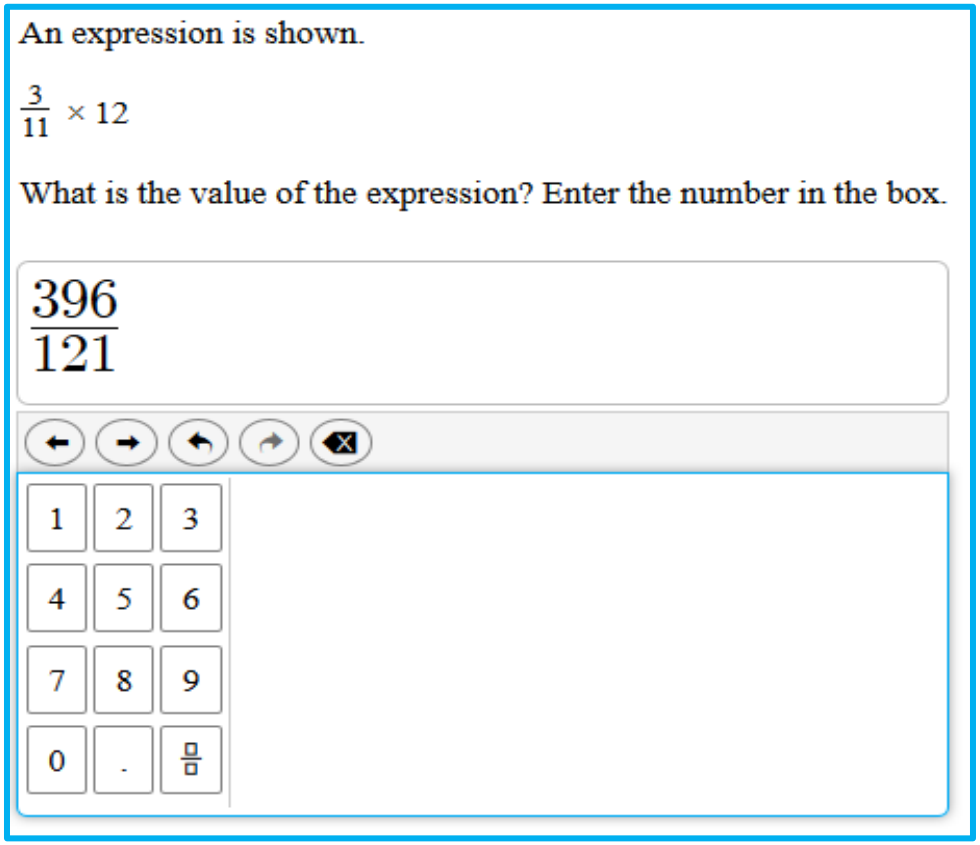
- The student may use repeated addition to identify the value of the expression.

  $\frac{3}{11} \times 12$

  $= \frac{3}{11} + \frac{3}{11} + \frac{3}{11} + \frac{3}{11} + \frac{3}{11} + \frac{3}{11} + \frac{3}{11} + \frac{3}{11} + \frac{3}{11} + \frac{3}{11} + \frac{3}{11} + \frac{3}{11}$

  $= \frac{36}{11}$

Sample Response: 1 point



Notes on Scoring

This response earns full credit (1 point) because it correctly identifies an equivalent value to the expression $\frac{3}{11} \times 12$.

- The student may use multiplication.

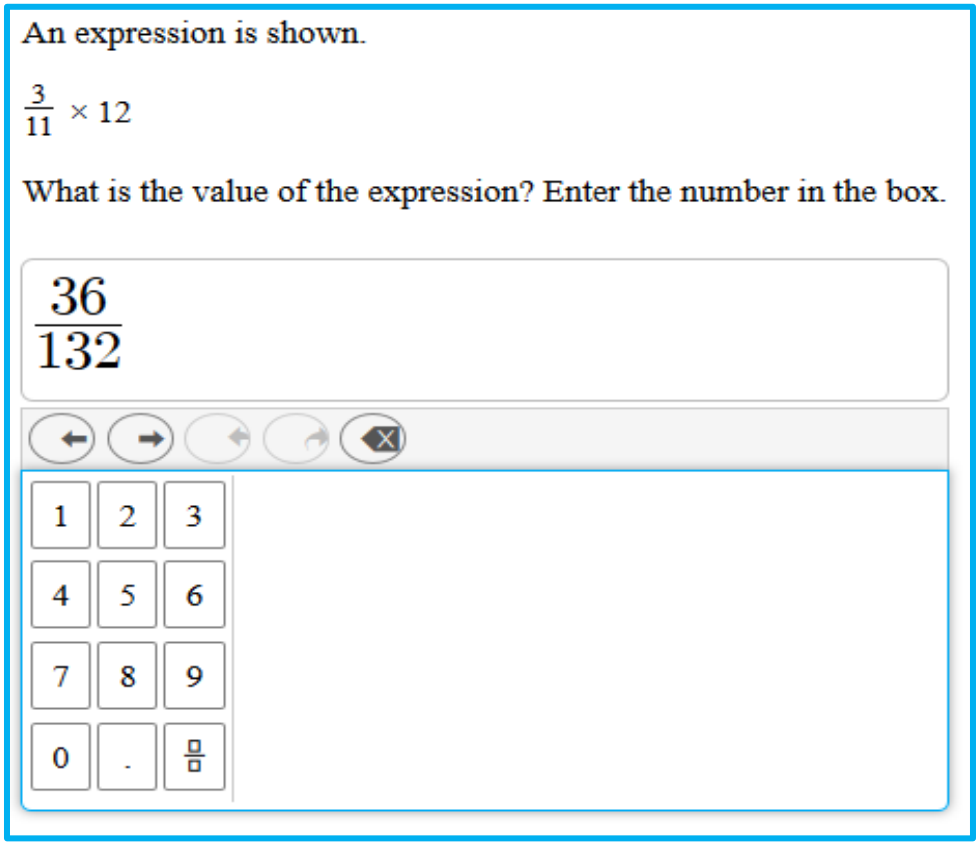
  $\frac{3}{11} \times 12$

  $= \frac{3}{11} \times \frac{12}{1} \times \frac{11}{11}$

  $= \left(\frac{3}{11} \times \frac{12}{1} \right) \times \frac{11}{11}$

  $= \frac{36}{11} \times \frac{11}{11} = \frac{396}{121}$

Sample Response: 0 points



Notes on Scoring

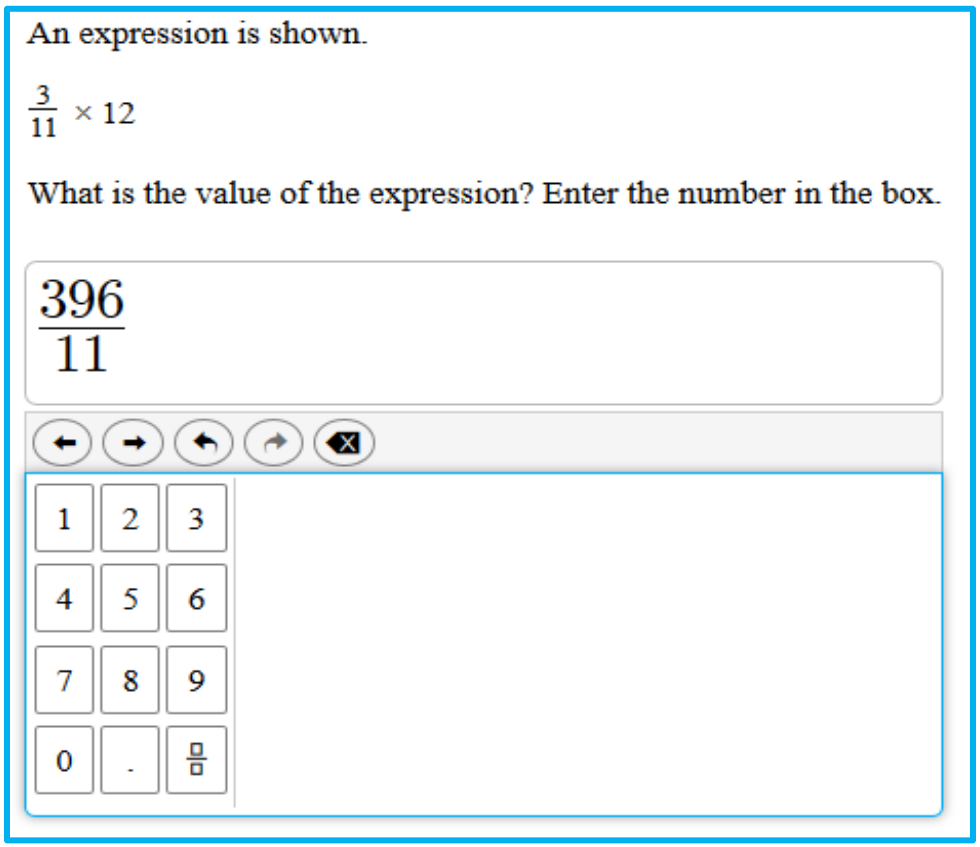
This response earns no credit (0 points) because it incorrectly identifies the value of the expression.

- The student may incorrectly multiply by $\frac{12}{12}$ instead of by $\frac{12}{1}$.

  $\frac{3}{11} \times 12$

  $\neq \frac{3}{11} \times \frac{12}{12} = \frac{36}{132}$

Sample Response: 0 points



Notes on Scoring

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

- The student may multiply incorrectly.

  $\frac{3}{11} \times 12$

  $\neq \frac{3}{11} \times \frac{12}{1} \times \frac{11}{1}$

  $= \left(\frac{3}{11} \times \frac{12}{1}\right) \times \frac{11}{1}$

  $= \frac{36}{11} \times \frac{11}{1} = \frac{396}{11}$

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Question 2

Question and Scoring Guidelines

Question 2

A number is shown.

0.023

What is this number described in words?

(A) twenty-three hundredths

(B) twenty-three thousandths

(C) two hundred and three hundredths

(D) two hundred and three thousandths

Points Possible: 1

Content Cluster: Understand the place value system.

Content Standard: Read, write, and compare decimals to thousandths.
a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 =
$3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (\frac{1}{10}) + 9 \times (\frac{1}{100}) + 2 \times (\frac{1}{1000})$. *(5.NBT.3a)*

Scoring Guidelines

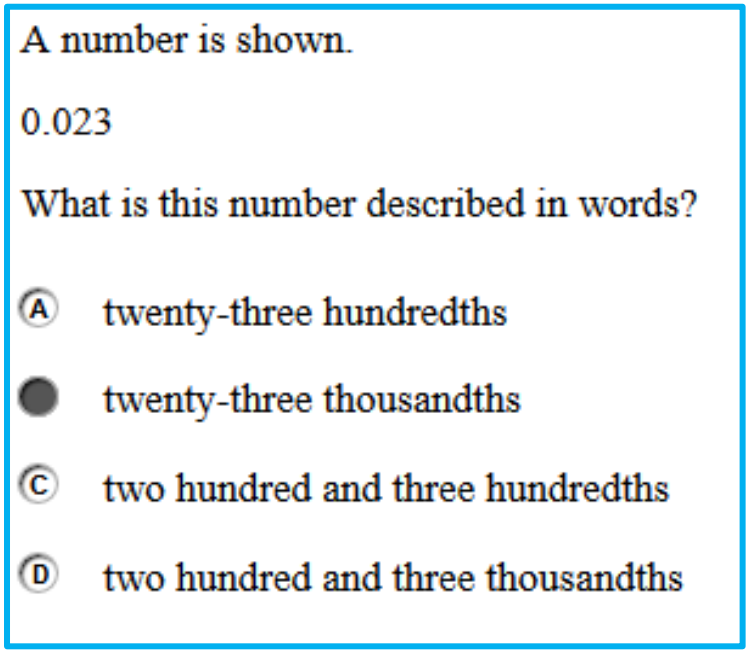
Rationale for Option A: This is incorrect. The student may confuse thousandths with hundredths.

Rationale for Option B: **Key** – The student correctly names the given number.

Rationale for Option C: This is incorrect. The student may think that the number is two hundred three instead of twenty-three.

Rationale for Option D: This is incorrect. The student may confuse hundred with hundredths.

Sample Response: 1 point



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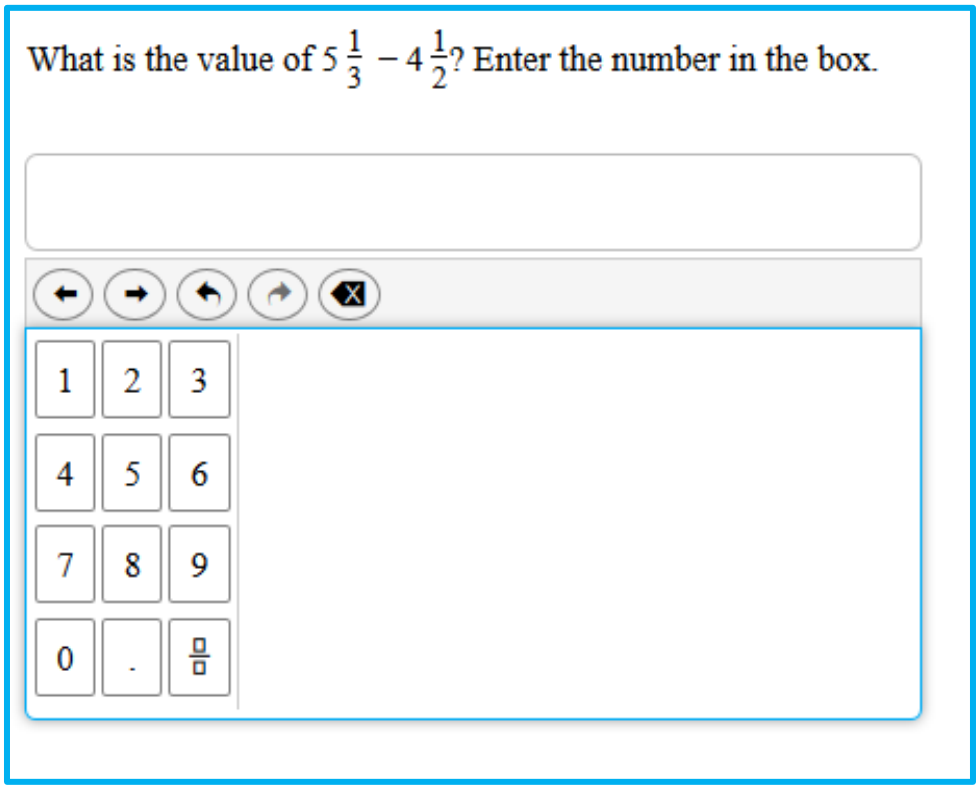
Question 3

Question and Scoring Guidelines

Question 3



Points Possible: 1

Content Cluster: Use equivalent fractions as a strategy to add and subtract fractions.

Content Standard: Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example,* $\frac{2}{3}+\frac{5}{4}=\frac{8}{12}+\frac{15}{12}=\frac{23}{12}$. *(In general,* $\frac{a}{b}+\frac{c}{d}=(\frac{(ad+bc)}{bd})$ *(5.NF.1)*

Scoring Guidelines

Exemplar Response

- $\frac{5}{6}$

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- A correct value (1 point).

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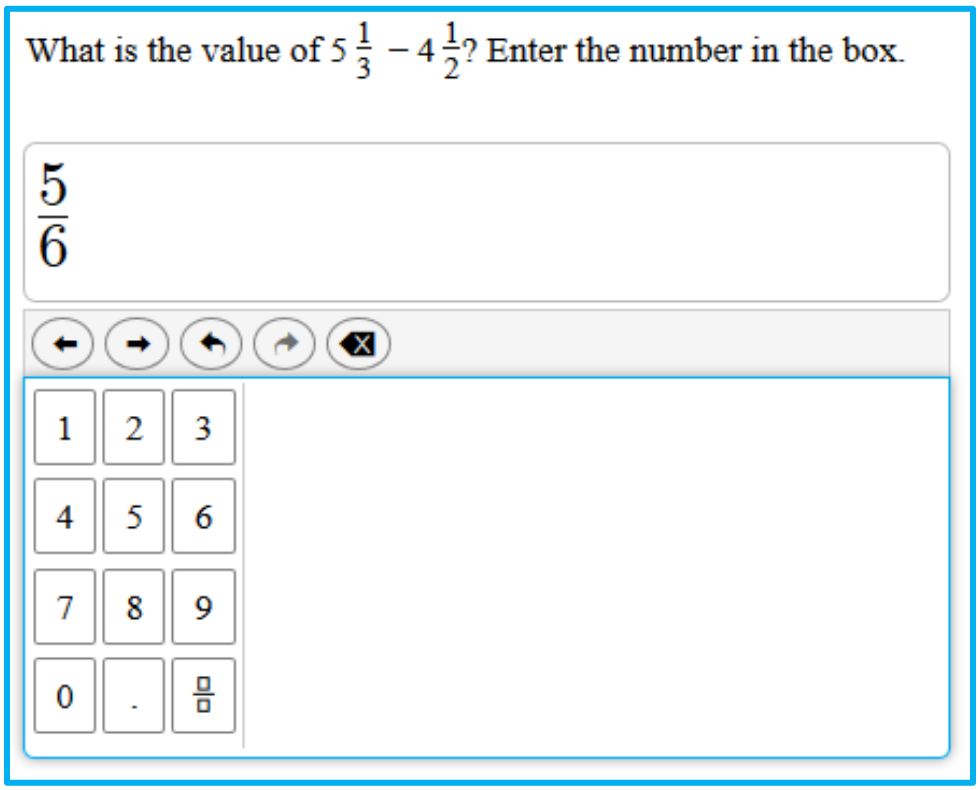
Question 3

Sample Responses

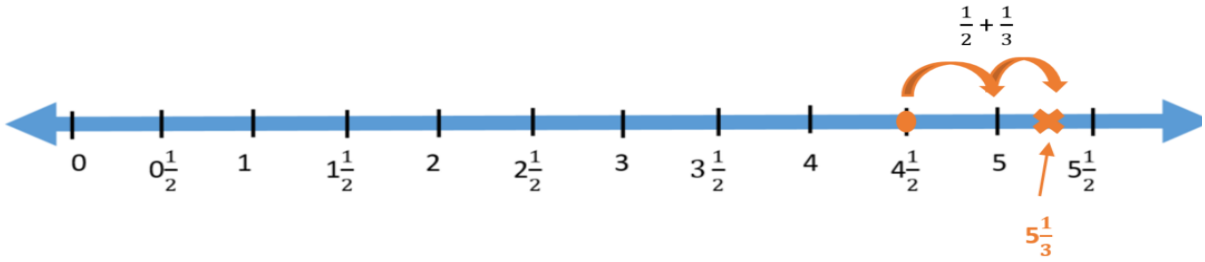
Sample Response: 1 point



Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the difference between $5\frac{1}{3}$ and $4\frac{1}{2}$.

- The student may count up from $4\frac{1}{2}$ using a number line until he or she reaches $5\frac{1}{3}$.



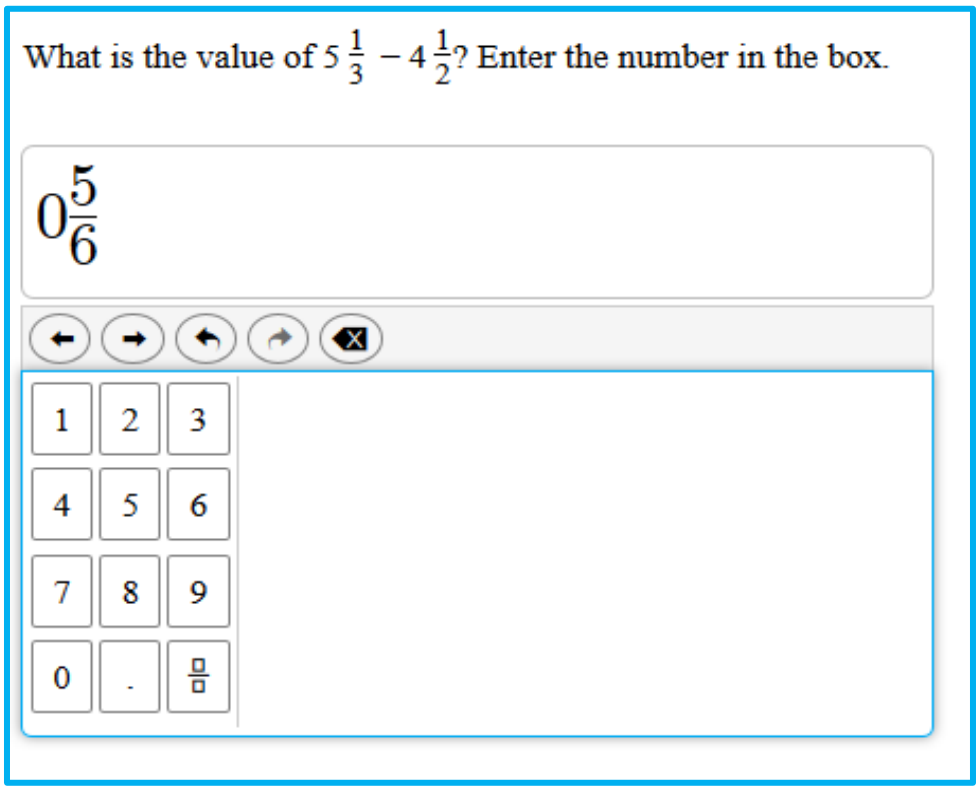
To go from $4\frac{1}{2}$ up to 5 is an increase of $\frac{1}{2}$. To go from 5 up to $5\frac{1}{3}$ is an increase of $\frac{1}{3}$.

$\frac{1}{2}+\frac{1}{3}$

$\frac{1}{2}\times\frac{3}{3}=\frac{3}{6}$ and $\frac{1}{3}\times\frac{2}{2}=\frac{2}{6}$

$=\frac{3}{6}+\frac{2}{6}=\frac{5}{6}$

Sample Response: 1 point



Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the difference between $5\frac{1}{3}$ and $4\frac{1}{2}$.

- The student may find common denominators and create equivalent fractions. Then the student may subtract the two mixed numbers by regrouping.

  $5\frac{1}{3} - 4\frac{1}{2}$

  $5\frac{1}{3} \times \frac{2}{2} = 5\frac{2}{6}$ and $4\frac{1}{2} \times \frac{3}{3} = 4\frac{3}{6}$

  $= 5\frac{2}{6} - 4\frac{3}{6}$

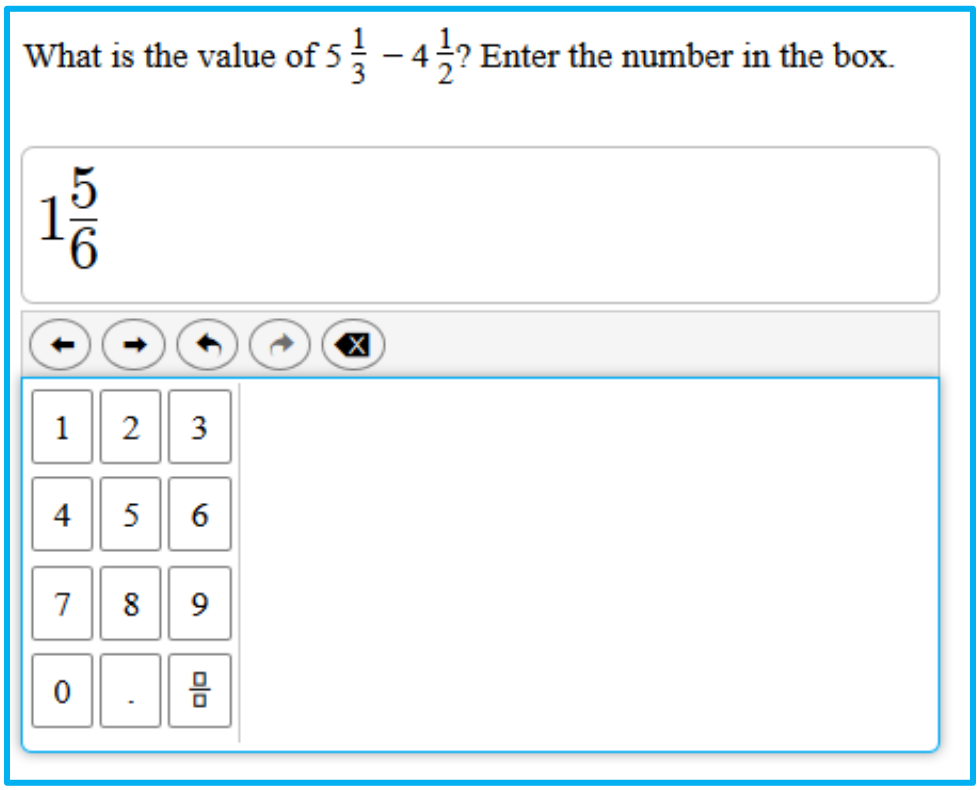
  $5\frac{2}{6} = 4 + 1 + \frac{2}{6} = 4 + \frac{6}{6} + \frac{2}{6} = 4\frac{8}{6}$

  $= 4\frac{8}{6} - 4\frac{3}{6}$

  $= 4 - 4 + \frac{8}{6} - \frac{3}{6}$

  $= 0 + \frac{5}{6} = 0\frac{5}{6}$

Sample Response: 0 points



Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the difference between $5\frac{1}{3}$ and $4\frac{1}{2}$.

- The student may find common denominators and create equivalent fractions. Then the student may incorrectly subtract the two mixed numbers by regrouping.

  $5\frac{1}{3} - 4\frac{1}{2}$

  $5\frac{1}{3} \times \frac{2}{2} = 5\frac{2}{6}$ and $4\frac{1}{2} \times \frac{3}{3} = 4\frac{3}{6}$

  $= 5\frac{2}{6} - 4\frac{3}{6}$

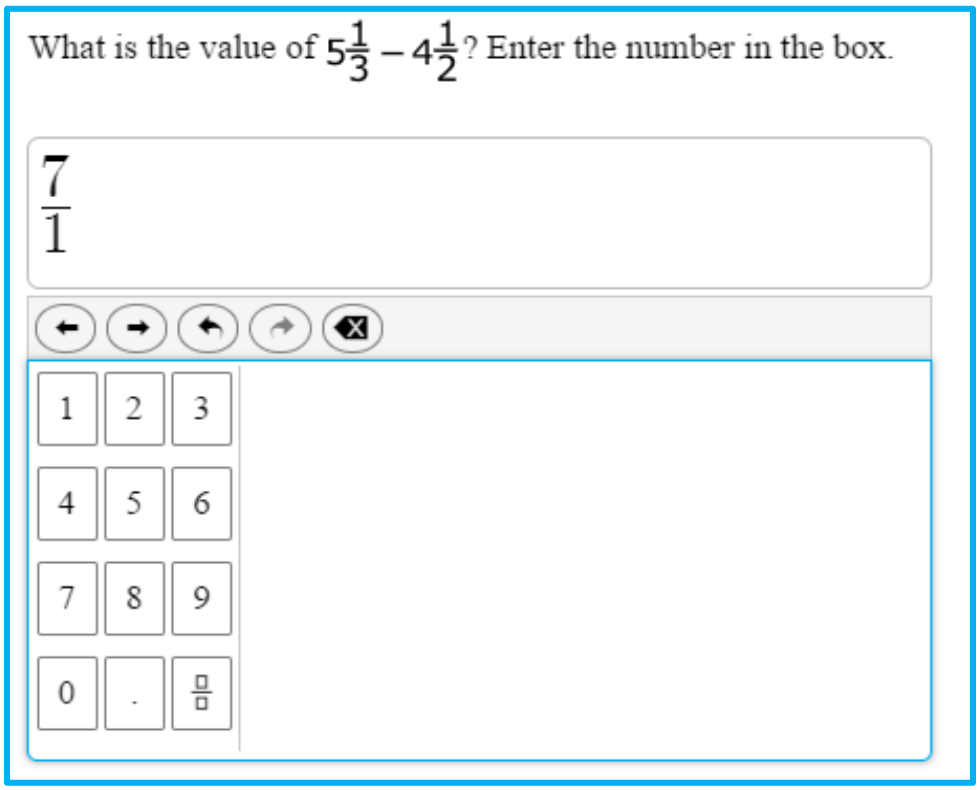
  $5\frac{2}{6} \neq 5 + \frac{6}{6} + \frac{2}{6} \neq 5\frac{8}{6}$

  $= 5\frac{8}{6} - 4\frac{3}{6}$

  $= 5 - 4 + \frac{8}{6} - \frac{3}{6}$

  $= 1 + \frac{5}{6} = 1\frac{5}{6}$

Sample Response: 0 points



Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the difference between $5\frac{1}{3}$ and $4\frac{1}{2}$.

- The student may create improper fractions and subtract without finding common denominators or creating equivalent fractions.

  $5\frac{1}{3} - 4\frac{1}{2}$

  $5\frac{1}{3} = \frac{16}{3}$ and $4\frac{1}{2} = \frac{9}{2}$

  $= \frac{16}{3} - \frac{9}{2}$

  $\neq \frac{7}{1}$

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Question 4

Question and Scoring Guidelines

Question 4

An expression is shown.

$8 + (37 - 19)$

Which statement describes the expression?

(A) 19 less than the value of 8 times 37

(B) 8 more than the value of 37 minus 19

(C) 8 times greater than the value of 37 minus 19

(D) 37 times greater than the value of 8 minus 19

Points Possible: 1

Content Cluster: Write and interpret numerical expressions.

Content Standard: Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product. (5.OA.2)*

Scoring Guidelines

Rationale for Option A: This is incorrect. The student may not understand how to interpret the expression.

Rationale for Option B: **Key** – The student correctly interprets the expression.

Rationale for Option C: This is incorrect. The student may misinterpret the expression.

Rationale for Option D: This is incorrect. The student may not understand how to interpret the expression.

Sample Response: 1 point

An expression is shown.

$8 + (37 - 19)$

Which statement describes the expression?

- (A) 19 less than the value of 8 times 37
- ● 8 more than the value of 37 minus 19
- (C) 8 times greater than the value of 37 minus 19
- (D) 37 times greater than the value of 8 minus 19

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Question 5

Question and Scoring Guidelines

Question 5

The area of Tracy's backyard is $1\frac{1}{3}$ acres. She plants a garden that takes up $\frac{1}{3}$ of the backyard.

What is the area, in acres, of the garden?

(A) $\frac{4}{9}$ acre

(B) 1 acre

(C) $1\frac{2}{3}$ acres

(D) 4 acres

Points Possible: 1

Content Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Content Standard: Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *(5.NF.6)*

Scoring Guidelines

Rationale for Option A: **Key** – The student correctly calculates the area.

Rationale for Option B: This is incorrect. The student may subtract $\frac{1}{3}$ from $1\frac{1}{3}$.

Rationale for Option C: This is incorrect. The student may add $1\frac{1}{3}$ and $\frac{1}{3}$.

Rationale for Option D: This is incorrect. The student may multiply $1\frac{1}{3}$ by 3.

Sample Response: 1 point

The area of Tracy's backyard is $1\frac{1}{3}$ acres. She plants a garden that takes up $\frac{1}{3}$ of the backyard.

What is the area, in acres, of the garden?

- ● $\frac{4}{9}$ acre
- Ⓑ 1 acre
- Ⓒ $1\frac{2}{3}$ acres
- Ⓓ 4 acres

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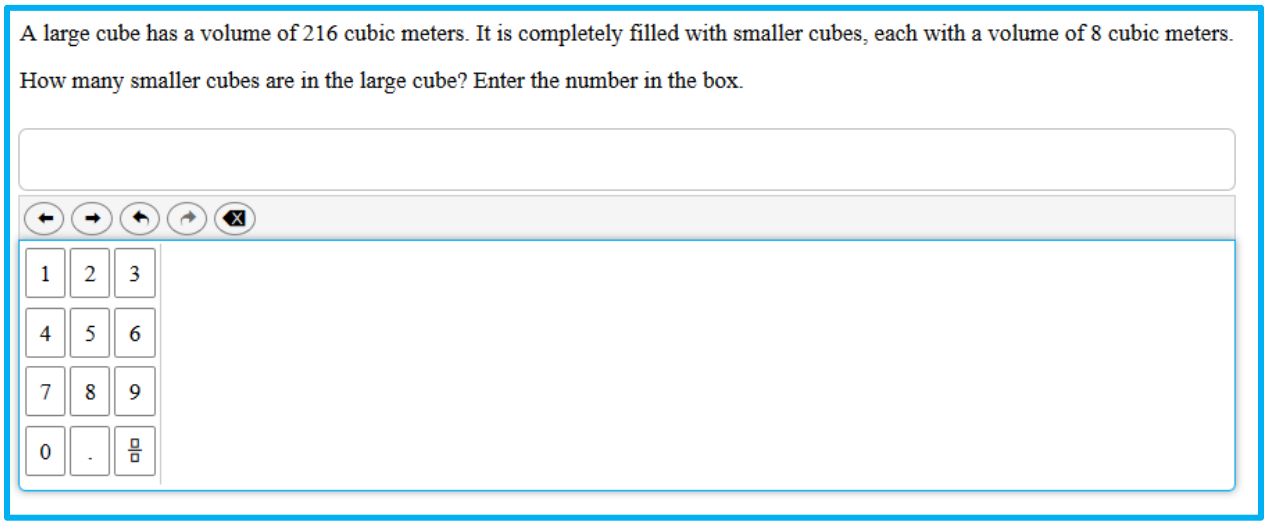
Question 6

Question and Scoring Guidelines

Question 6



Points Possible: 1

Content Cluster: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

Content Standard: Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. *(5.MD.4)*

Scoring Guidelines

Exemplar Response

- 27

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- A correct value (1 point).

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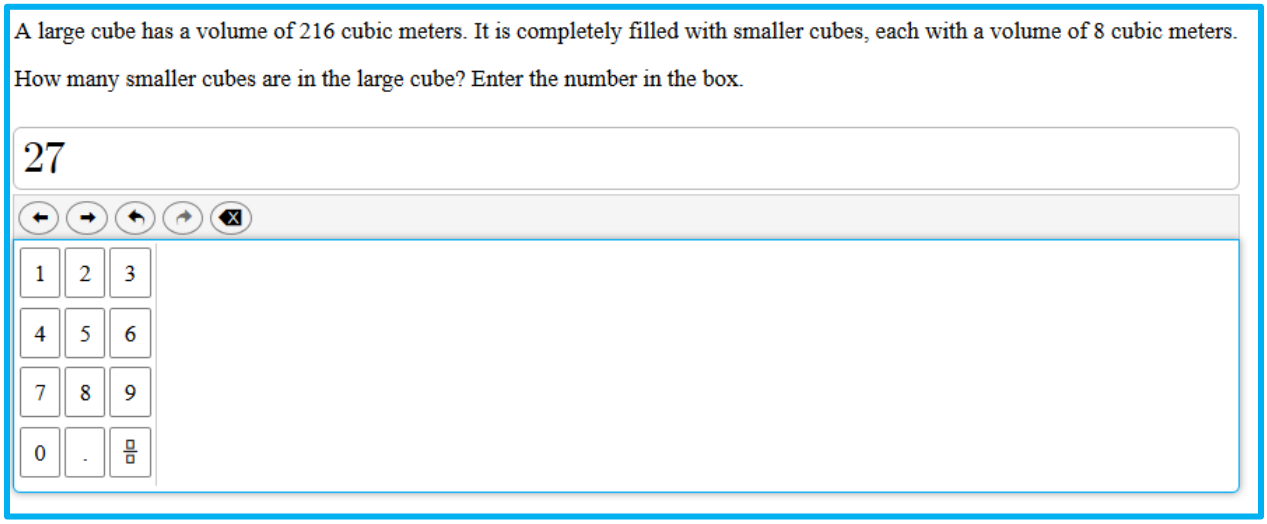
Question 6

Sample Responses

Sample Response: 1 point



Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the number of smaller cubes needed to completely fill the larger cube.

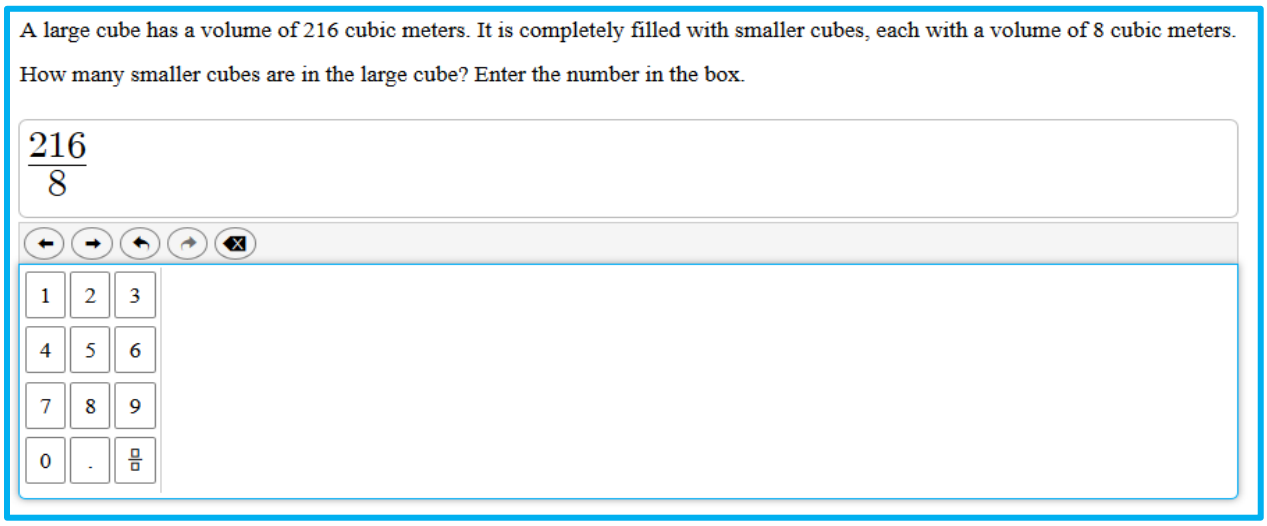
- The student may solve the problem using an area model.

	20	+	7
8	$^{1}\cancel{2}^{1}16$ $-\ 160$ 56		56 -56 0

$20 + 7 = 27$

$216 \div 8 = 27$

Sample Response: 1 point



Notes on Scoring

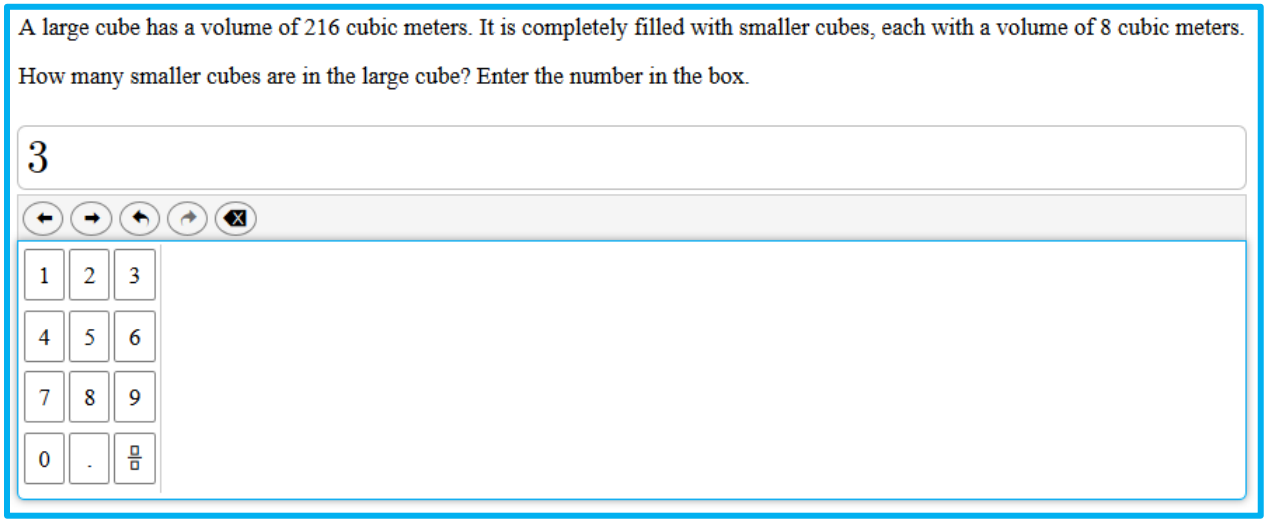
This response earns full credit (1 point) because it correctly identifies the number of smaller cubes needed to completely fill the larger cube.

- The student may recognize that he or she can express the quotient of a division problem as a fraction.

  $216 \div 8 = \frac{216}{8}$

A student can earn credit in grade 5 by identifying an equivalent value to a correct response.

Sample Response: 0 points



Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the number of smaller cubes needed to completely fill the larger cube.

- The student may use area instead of volume to find the number of square tiles needed to cover an area of 216 square meters.

8 × 8 = 64 square meters

216 ÷ 64

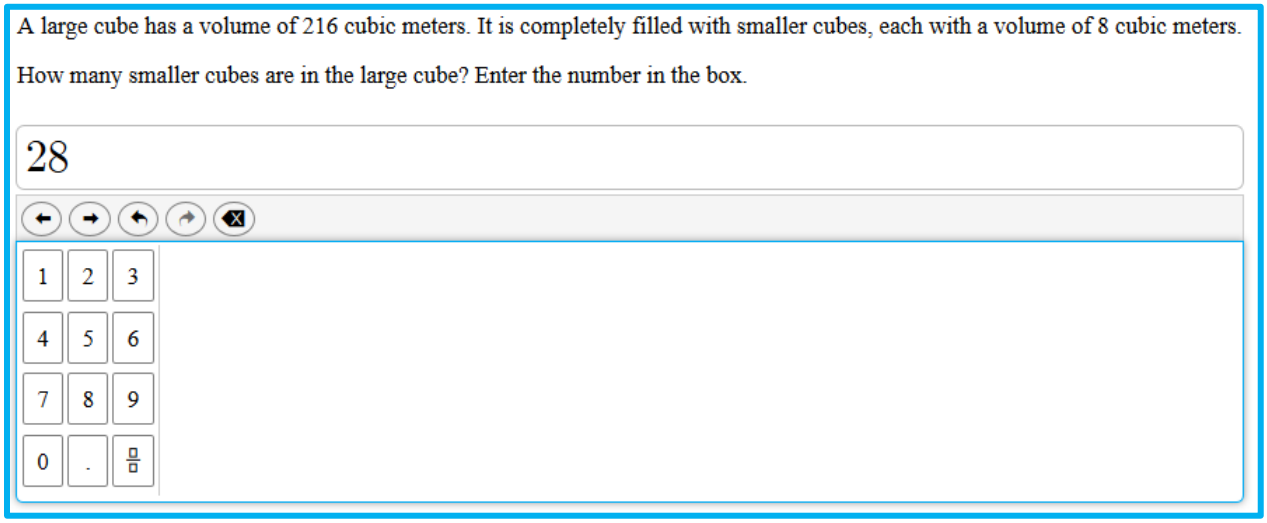
= 1 + 2 + remainder 24

= 3 remainder 24

```
        1
        2   r. 24
64 | 216
   –128   = 64 × 2
     88
    –64   = 64 × 1
     24
```

= 3 because a fourth tile with an area of 64 square meters will not fit

Sample Response: 0 points



Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the number of smaller cubes needed to completely fill the larger cube.

- The student may incorrectly divide 216 by 8 using partial quotients.

$216 \div 8$

$20 + 8 = 28$

$216 \div 8 \neq 28$

$$\begin{array}{rl|l} & 8 & \\ & 20 & \\ 8 & 216 & \\ & \underline{-160} & = 20 \times 8 \\ & 56 & \\ & \underline{-56} & \neq \ 8 \times 8 \\ & 0 & \end{array}$$

Grade 5
Math
Spring 2017 Item Release

Question 7

Question and Scoring Guidelines

Question 7

Select the **two** expressions that have a value greater than 253.

- ☐ $253 \times \frac{3}{4}$
- ☐ $253 \times \frac{5}{5}$
- ☐ $253 \times \frac{9}{2}$
- ☐ $253 \times \frac{6}{7}$
- ☐ $253 \times \frac{4}{1}$

Points Possible: 1

Content Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Content Standard: Interpret multiplication as scaling (resizing), by:
a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. *(5.NF.5a)*

Scoring Guidelines

Rationale for First Option: This is incorrect. The student may think that multiplication always results in the original number becoming larger.

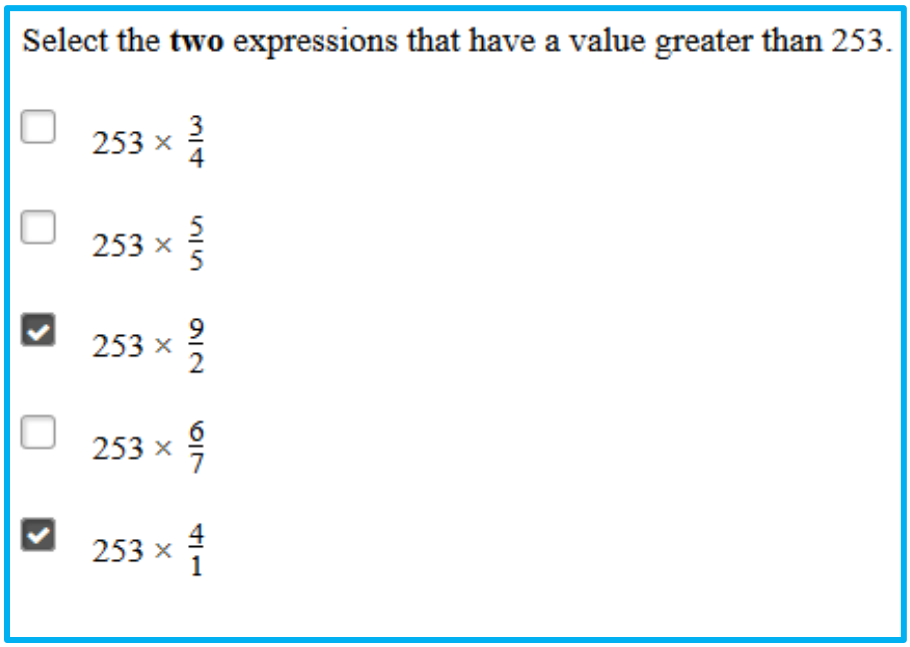
Rationale for Second Option: This is incorrect. The student may select the option where 253 remains the same value.

Rationale for Third Option: **Key** – The student correctly identifies that multiplying by a fraction greater than 1 results in a larger number.

Rationale for Fourth Option: This is incorrect. The student may think that multiplication always results in the original number becoming larger.

Rationale for Fifth Option: **Key** – The student correctly identifies that multiplying by a fraction greater than 1 results in a larger number.

Sample Response: 1 point



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Math
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Question 8

Question and Scoring Guidelines

Question 8

Select the boxes to show whether each number rounds to 7, 8, or 9 when rounded to the nearest whole number.

	7	8	9
7.47	☐	☐	☐
8.367	☐	☐	☐
7.8	☐	☐	☐
7.352	☐	☐	☐
7.51	☐	☐	☐
8.531	☐	☐	☐

Points Possible: 1

Content Cluster: Understand the place value system.

Content Standard: Use place value understanding to round decimals to any place. *(5.NBT.4)*

Scoring Guidelines

For this item, a full-credit response includes:

- "7" selected for "7.47";
  AND
- "8" selected for "8.367";
  AND
- "8" selected for "7.8";
  AND
- "7" selected for "7.352";
  AND
- "8" selected for "7.51";
  AND
- "9" selected for "8.531." (1 point).

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Math
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Question 8

Sample Responses

Sample Response: 1 point

Select the boxes to show whether each number rounds to 7, 8, or 9 when rounded to the nearest whole number.

	7	8	9
7.47	☑	☐	☐
8.367	☐	☑	☐
7.8	☐	☑	☐
7.352	☑	☐	☐
7.51	☐	☑	☐
8.531	☐	☐	☑

Notes on Scoring

This response earns full credit (1 point) because it correctly identifies whether each decimal number rounds to 7, 8 or 9 when rounded to the nearest whole number.

Sample Response: 0 points

Select the boxes to show whether each number rounds to 7, 8, or 9 when rounded to the nearest whole number.

	7	8	9
7.47	☑	☐	☐
8.367	☐	☑	☐
7.8	☐	☑	☐
7.352	☑	☐	☐
7.51	☑	☐	☐
8.531	☐	☑	☐

Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies whether each decimal number rounds to 7, 8 or 9 when rounded to the nearest whole number.

- The student incorrectly rounds 7.51 and 8.531.

Sample Response: 0 points

Select the boxes to show whether each number rounds to 7, 8, or 9 when rounded to the nearest whole number.

	7	8	9
7.47	☐	☑	☐
8.367	☐	☑	☐
7.8	☐	☑	☐
7.352	☑	☐	☐
7.51	☐	☑	☐
8.531	☐	☐	☑

Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies whether each decimal number rounds to 7, 8 or 9 when rounded to the nearest whole number.

- The student incorrectly rounds 7.47. The student may *double round* by rounding 7.47 up to 7.5 and then rounding 7.5 up to 8.

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Math
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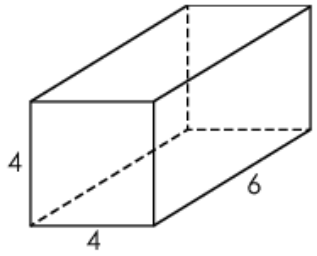
Question 9

Question and Scoring Guidelines

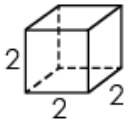
Question 9

A rectangular prism is shown.

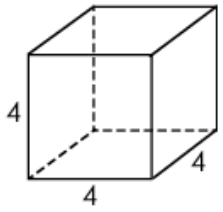


Which block could be used to find the volume of the rectangular prism?

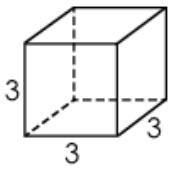
Ⓐ



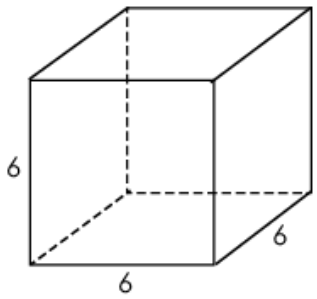
Ⓒ



Ⓑ



Ⓓ



Points Possible: 1

Content Cluster: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

Content Standard: Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
b. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units. (*5.MD.3b*)

Scoring Guidelines

Rationale for Option A: **Key** – The student correctly identifies the 2 × 2 × 2 cube as the only cube that can be used to fill the rectangular prism without any gaps or overlaps.

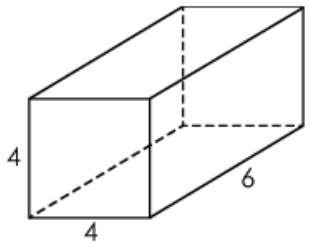
Rationale for Option B: This is incorrect. The student may choose the 3 × 3 × 3 cube because it is less than both the dimensions.

Rationale for Option C: This is incorrect. The student may choose the 4 × 4 × 4 cube because two of the dimensions are 4.

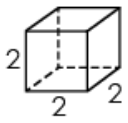
Rationale for Option D: This is incorrect. The student may choose the 6 × 6 × 6 cube because the greatest dimension is 6.

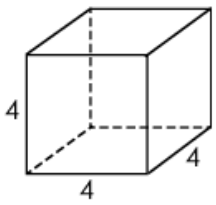
Sample Response: 1 point

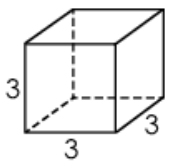
A rectangular prism is shown.

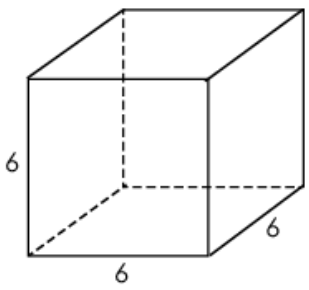


Which block could be used to find the volume of the rectangular prism?

● 

Ⓒ 

Ⓑ 

Ⓓ 

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Question 10

Question and Scoring Guidelines

Question 10

An expression is shown.

$12 + 24$

Select the **three** expressions that are equivalent to the given expression.

- [ ] $3(4 + 8)$
- [ ] $3(8 + 12)$
- [ ] $4(3 + 6)$
- [ ] $4(6 + 12)$
- [ ] $6(2 + 4)$

Points Possible: 1

Content Strand: Write and interpret numerical expressions.

Content Standard: Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. *(5.OA.1)*

Scoring Guidelines

Rationale for First Option: **Key** – The student correctly finds a common factor and uses the distributive property to find an answer.

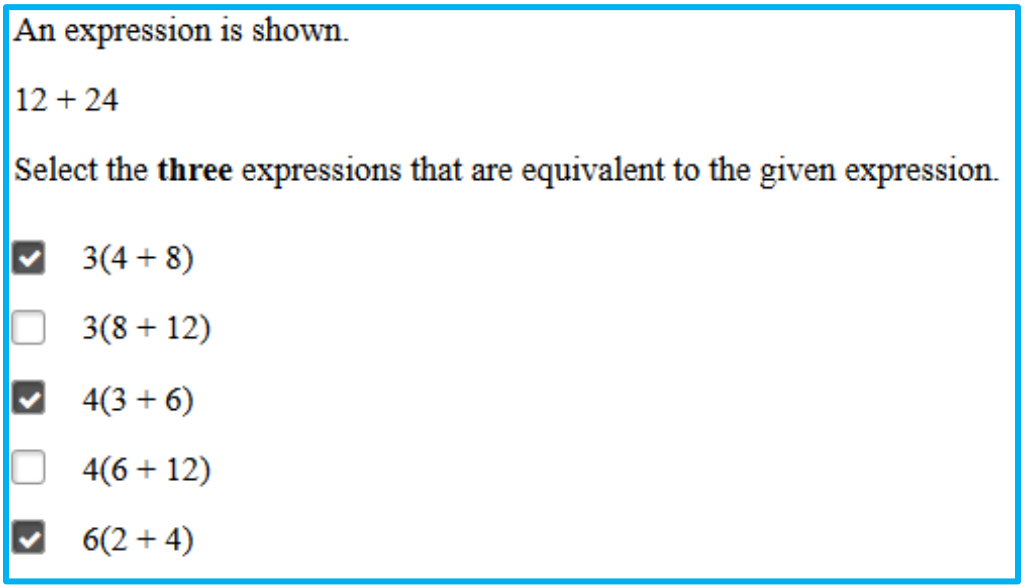
Rationale for Second Option: This is incorrect. The student may only distribute the 3 to the 8 to get 24.

Rationale for Third Option: **Key** – The student correctly finds a common factor and uses the distributive property to find an answer.

Rationale for Fourth Option: This is incorrect. The student may only distribute the 4 to the 6 to get 24.

Rationale for Fifth Option: **Key** – The student correctly finds a common factor and uses the distributive property to find an answer.

Sample Response: 1 point



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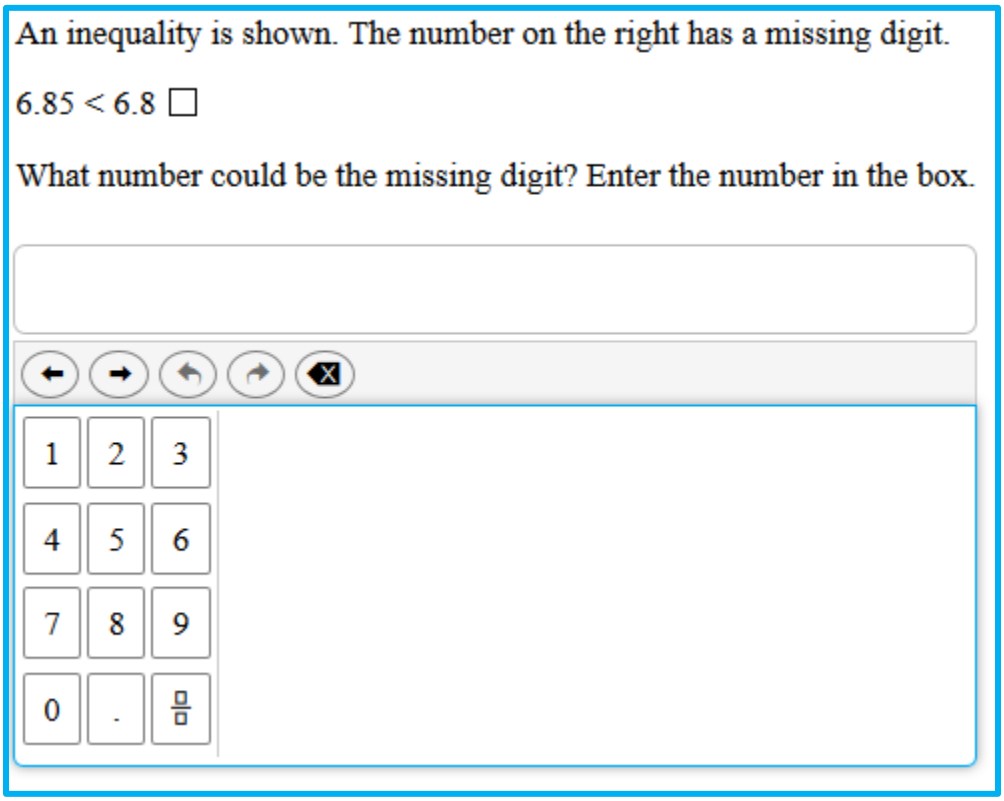
Question 11

Question and Scoring Guidelines

Question 11



Points Possible: 1

Content Cluster: Understand the place value system.

Content Standard: Read, write, and compare decimals to thousandths.
b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. *(5.NBT.3b)*

Scoring Guidelines

Exemplar Response

- 6

Other Correct Responses

- 7
- 8
- 9

For this item, a full-credit response includes:

- A correct value (1 point).

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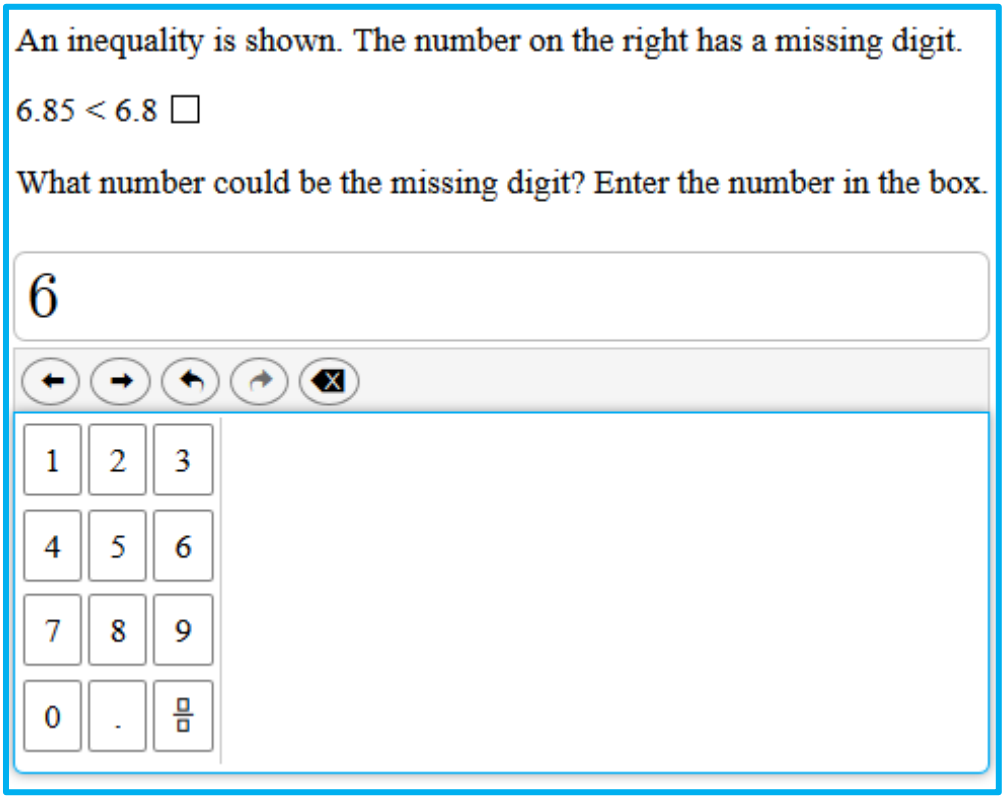
Question 11

Sample Responses

Sample Response: 1 point

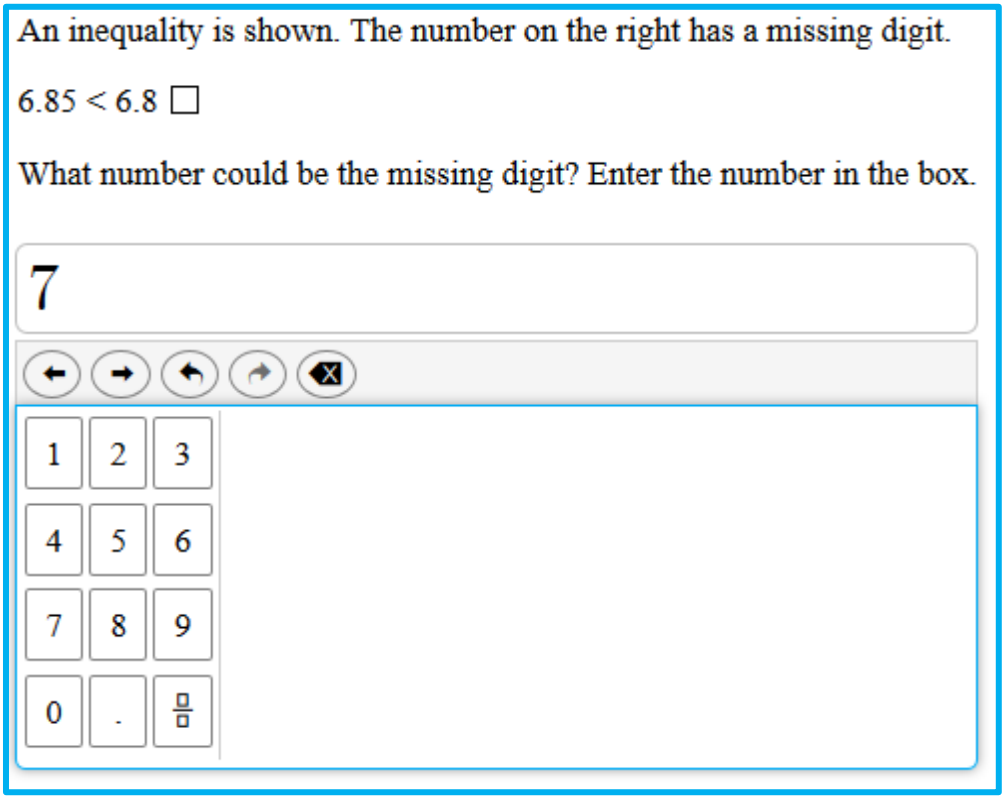


Notes on Scoring

This response earns full credit (1 point) because it correctly identifies a number that can be used as the missing digit to make the inequality true.

$6.85 < 6.86$

Sample Response: 1 point

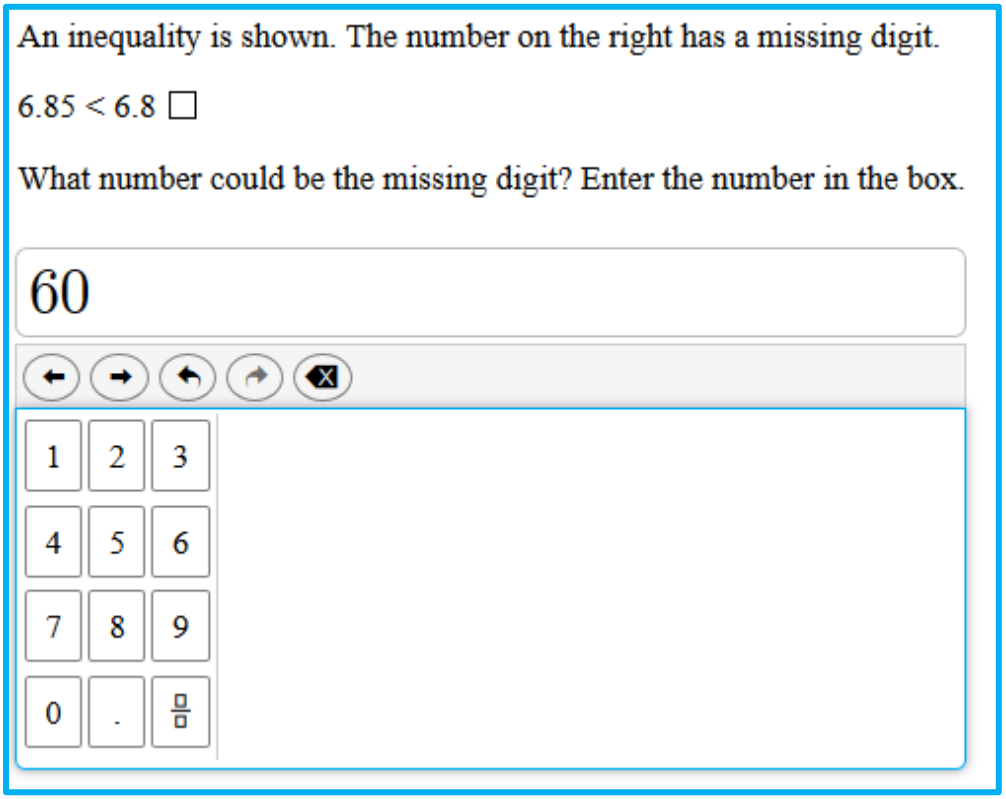


Notes on Scoring

This response earns full credit (1 point) because it correctly identifies a number that can be used as the missing digit to make the inequality true.

$6.85 < 6.87$

Sample Response: 0 points

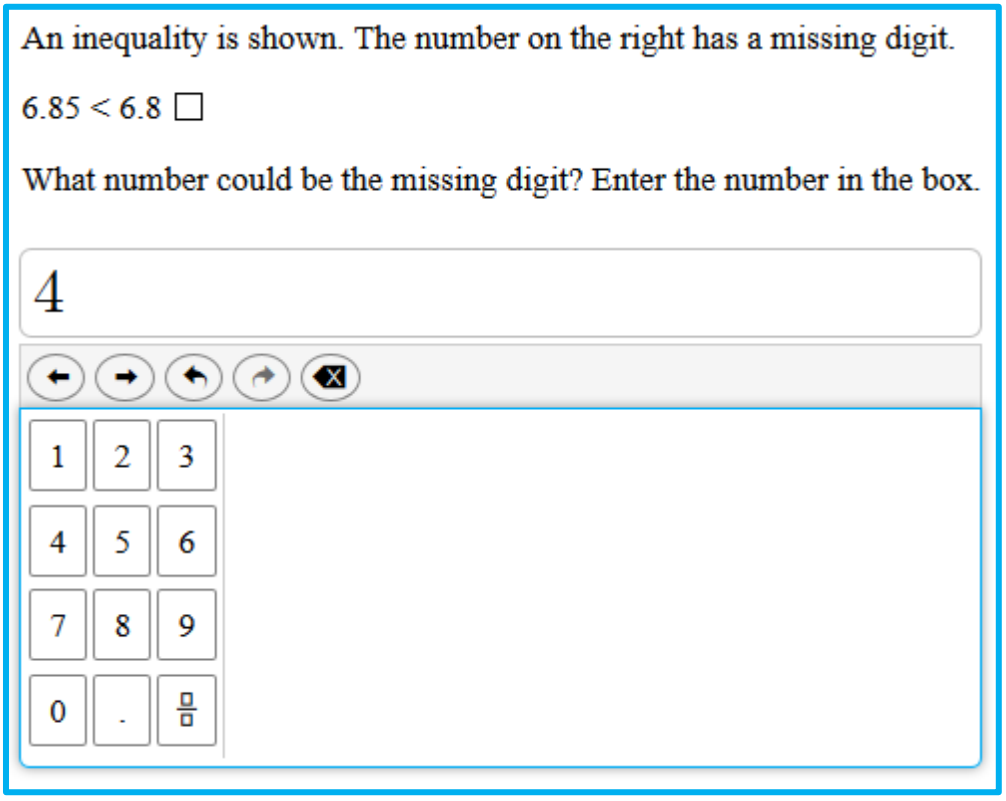


Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies a number that can be used as the missing digit to make the inequality true.

- The student may think that he or she may enter any number to make the inequality true instead of a one-digit number.
- The student may think the comparison shown represents a decimal to the hundredths compared to any decimal number greater than 6.85 instead of a comparison of two decimal numbers to the hundredths.

Sample Response: 0 points



Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies a number that can be used as the missing digit to make the inequality true.

- The student enters a number that makes the inequality false. 6.85 > 6.84

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Question 12

Question and Scoring Guidelines

Question 12

A pet store owner has a $\frac{1}{2}$-pound bag of dog treats that she divides evenly among 16 dogs.

What amount of dog treats, in pounds, does each dog receive?

(A) $\frac{1}{32}$ pound

(B) $\frac{1}{18}$ pound

(C) 8 pounds

(D) 32 pounds

Points Possible: 1

Content Cluster: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Content Standard: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.[1]
c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share $\frac{1}{2}$ lb of chocolate equally? How many $\frac{1}{3}$ cup servings are in 2 cups of raisins?* (5.NF.7c)

Scoring Guidelines

Rationale for Option A: **Key** – The student correctly divides $\frac{1}{2}$ by 16.

Rationale for Option B: This is incorrect. The student may add the denominators.

Rationale for Option C: This is incorrect. The student may multiply instead of divide.

Rationale for Option D: This is incorrect. The student may multiply 16 by the reciprocal of $\frac{1}{2}$.

Sample Response: 1 point

A pet store owner has a $\frac{1}{2}$-pound bag of dog treats that she divides evenly among 16 dogs.

What amount of dog treats, in pounds, does each dog receive?

- ● $\frac{1}{32}$ pound
- Ⓑ $\frac{1}{18}$ pound
- Ⓒ 8 pounds
- Ⓓ 32 pounds

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Question 13

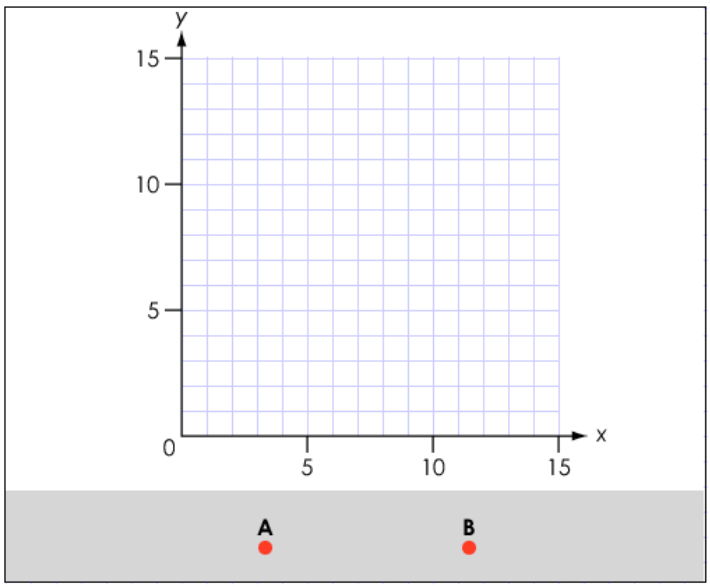
Question and Scoring Guidelines

Question 13

A coordinate plane is shown.

- Point A is located at (8, 6).
- Point B is 3 units to the right of point A and 5 units down.

Move each point to the correct location on the coordinate plane.



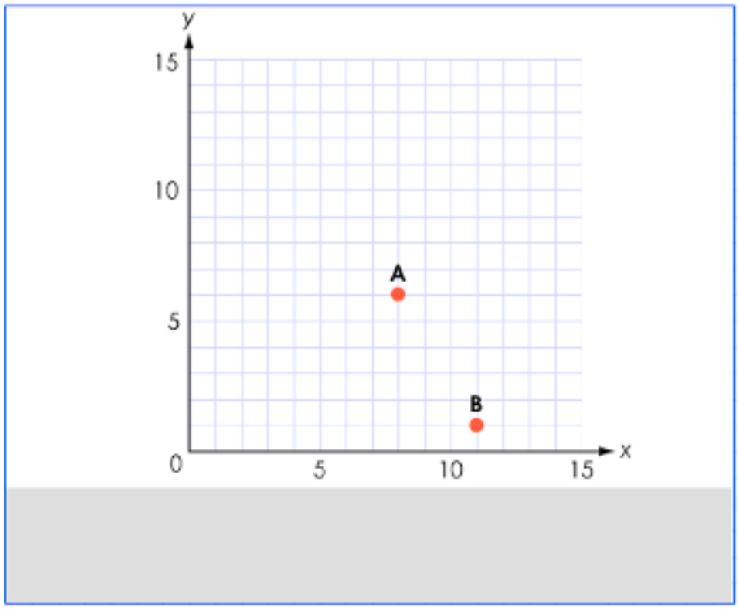
Points Possible: 1

Content Cluster: Graph points on the coordinate plane to solve real-world and mathematical problems.

Content Standard: Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. *(5.G.2)*

Scoring Guidelines

Exemplar Response



Other Correct Responses

- N/A

For this item, a full-credit response includes:

- A correct placement of the points (1 point).

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Question 13

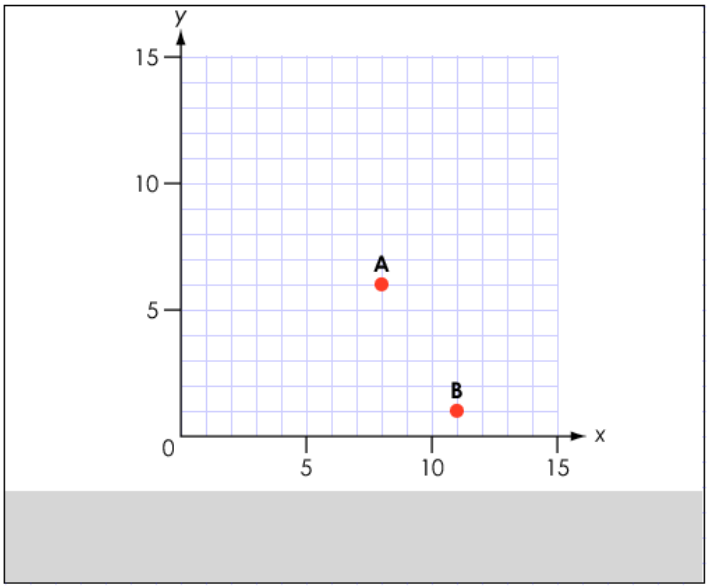
Sample Responses

Sample Response: 1 point

A coordinate plane is shown.

- Point A is located at (8, 6).
- Point B is 3 units to the right of point A and 5 units down.

Move each point to the correct location on the coordinate plane.



Notes on Scoring

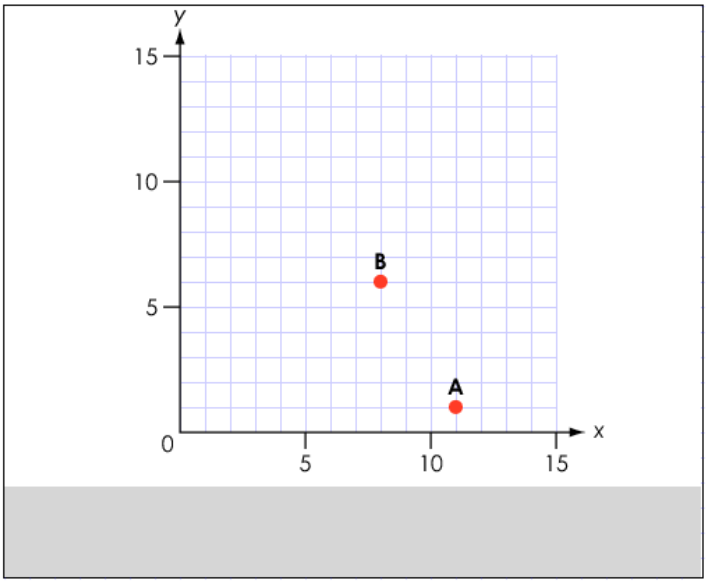
This response earns full credit (1 point) because it identifies the correct location of Point A and Point B on the coordinate plane.

Sample Response: 0 points

A coordinate plane is shown.

- Point A is located at (8, 6).
- Point B is 3 units to the right of point A and 5 units down.

Move each point to the correct location on the coordinate plane.



Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect location of Point A and Point B on the coordinate plane.

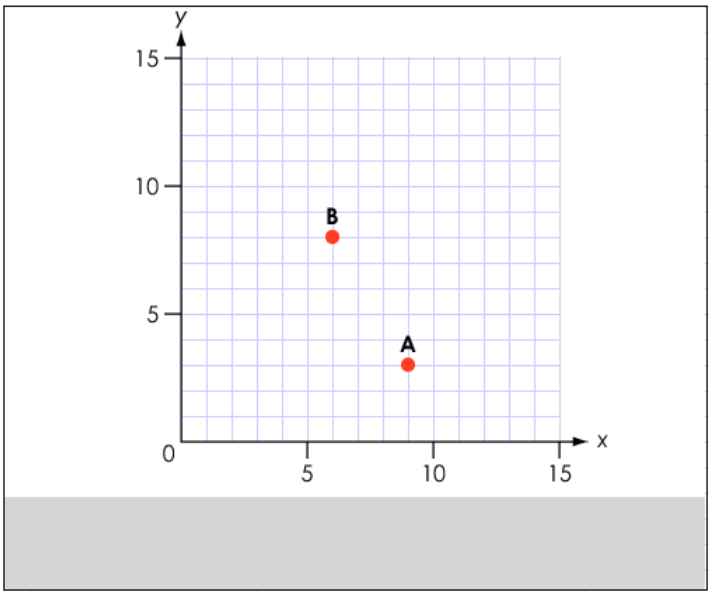
- The student reverses the locations of Point A and Point B.

Sample Response: 0 points

A coordinate plane is shown.

- Point A is located at (8, 6).
- Point B is 3 units to the right of point A and 5 units down.

Move each point to the correct location on the coordinate plane.



Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect location of Point A and Point B on the coordinate plane.

- The student places Point B at (6, 8) and places Point A three units to the right and five units down from Point B at (9, 3).

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Question 14

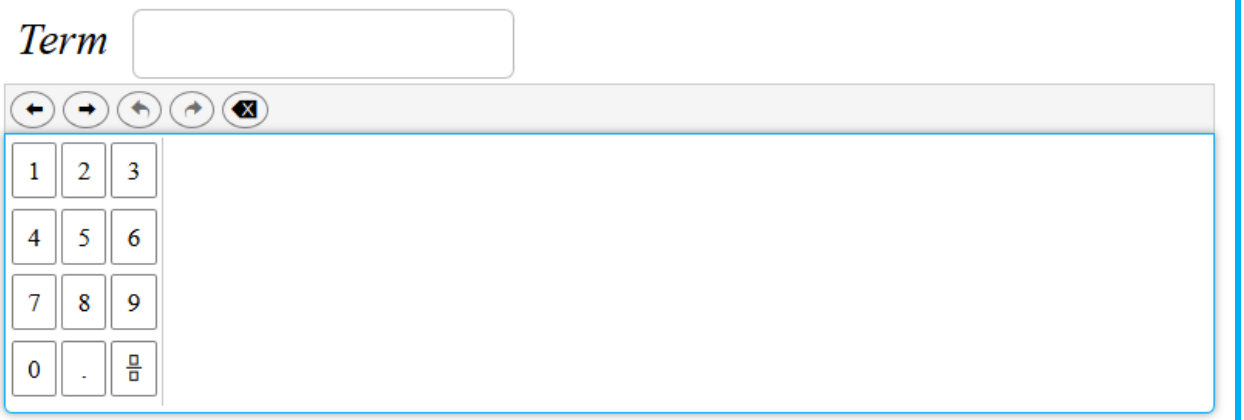
Question and Scoring Guidelines

Question 14

Sam and Kelly create number patterns.

- In Sam's pattern, Term 1 is 1, and the rule is "Add 5."
- In Kelly's pattern, Term 1 is 2, and the rule is "Multiply by 2."

For which term in the patterns do Sam and Kelly get the same result from their rules? Enter the number in the box.



Points Possible: 1

Content Cluster: Analyze patterns and relationships.

Content Standard: Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so. (5.OA.3)*

Scoring Guidelines

Exemplar Response

- Term 4

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- The correct term number (1 point).

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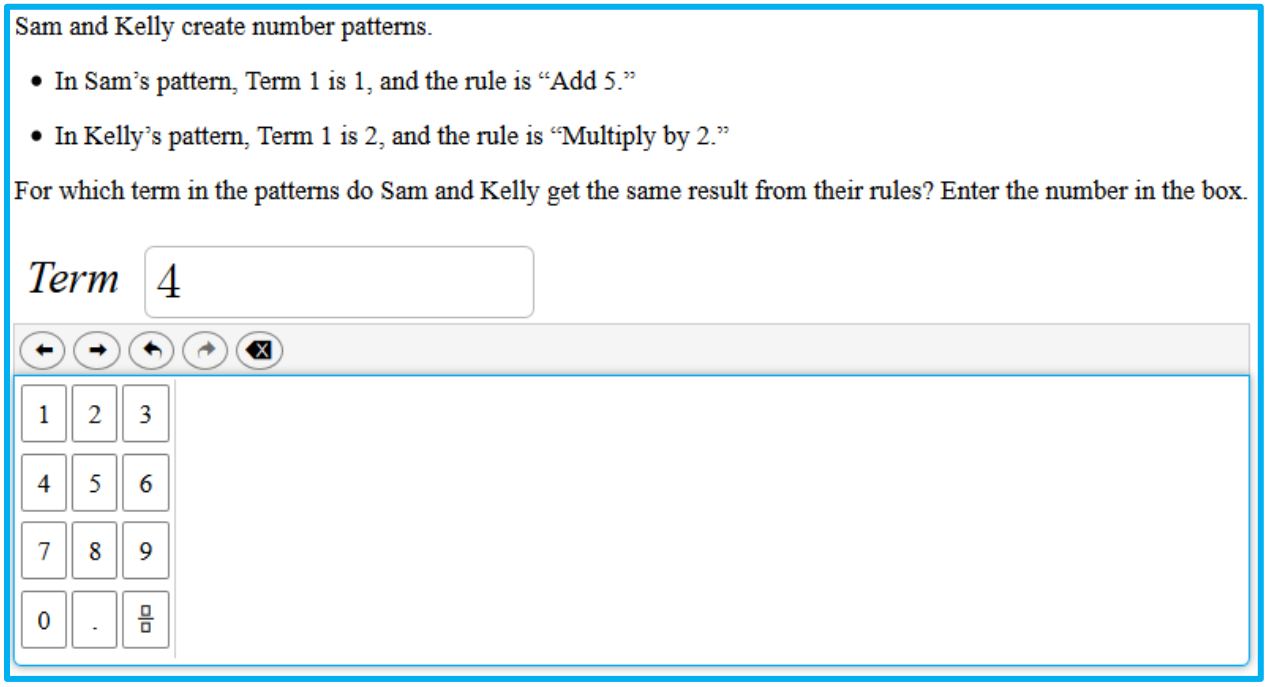
Question 14

Sample Responses

Sample Response: 1 point

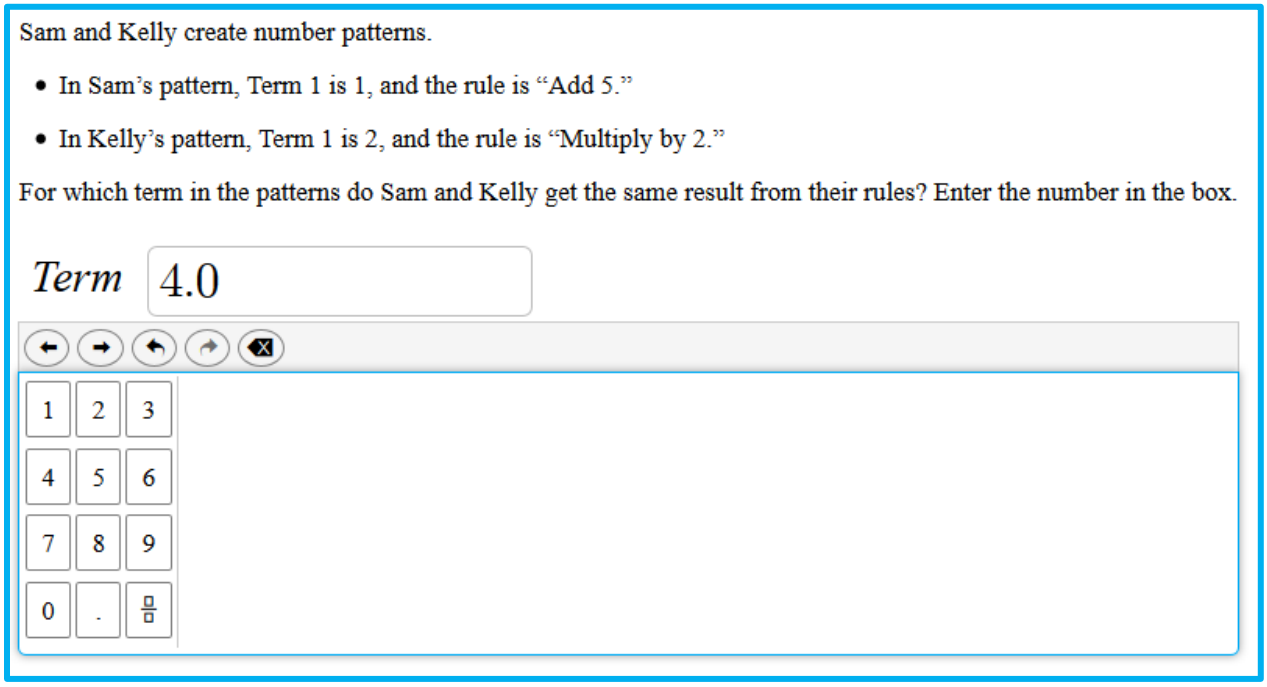


Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the term in both patterns where Sam and Kelly get the same result from their rules.

Term	Sam	Kelly
1	1	2
2	6	4
3	11	8
4	16	16
5	21	32

Sample Response: 1 point



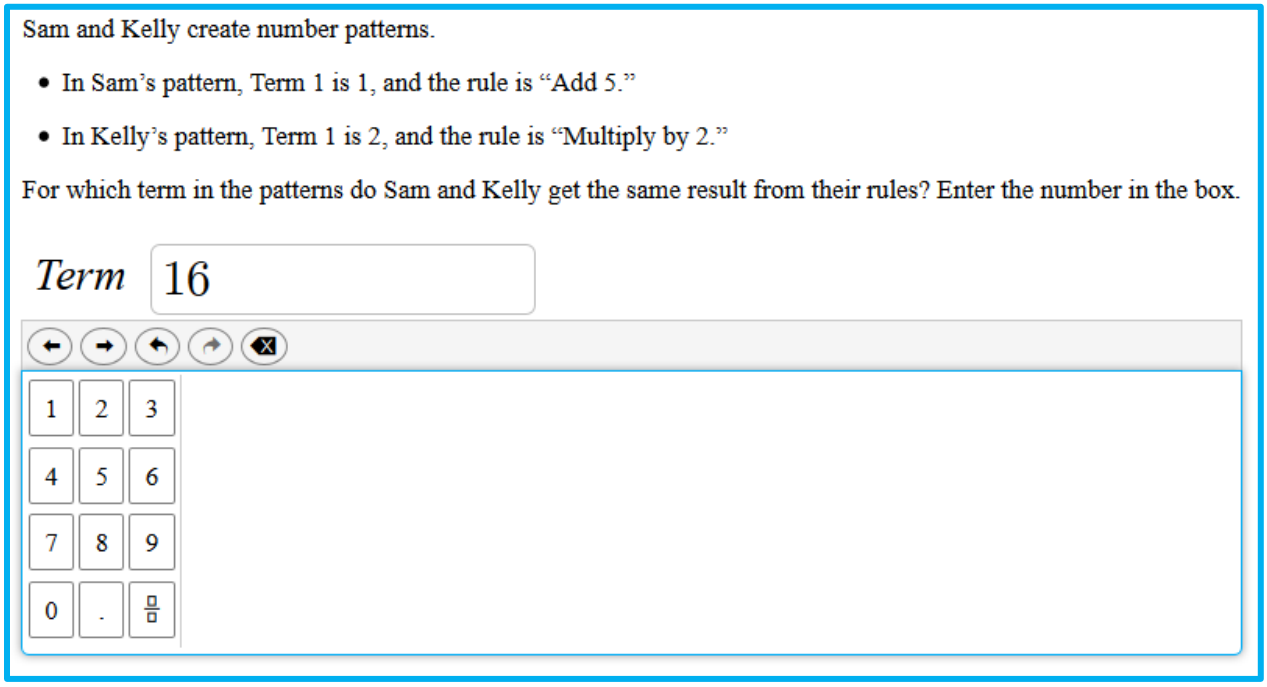
Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the term in both patterns where Sam and Kelly get the same result from their rules.

Term	Sam	Kelly
1	1.0	2.0
2	6.0	4.0
3	11.0	8.0
4	16.0	16.0
5	21.0	32.0

A student can earn credit in grade 5 by identifying an equivalent value to a correct response.

Sample Response: 0 points



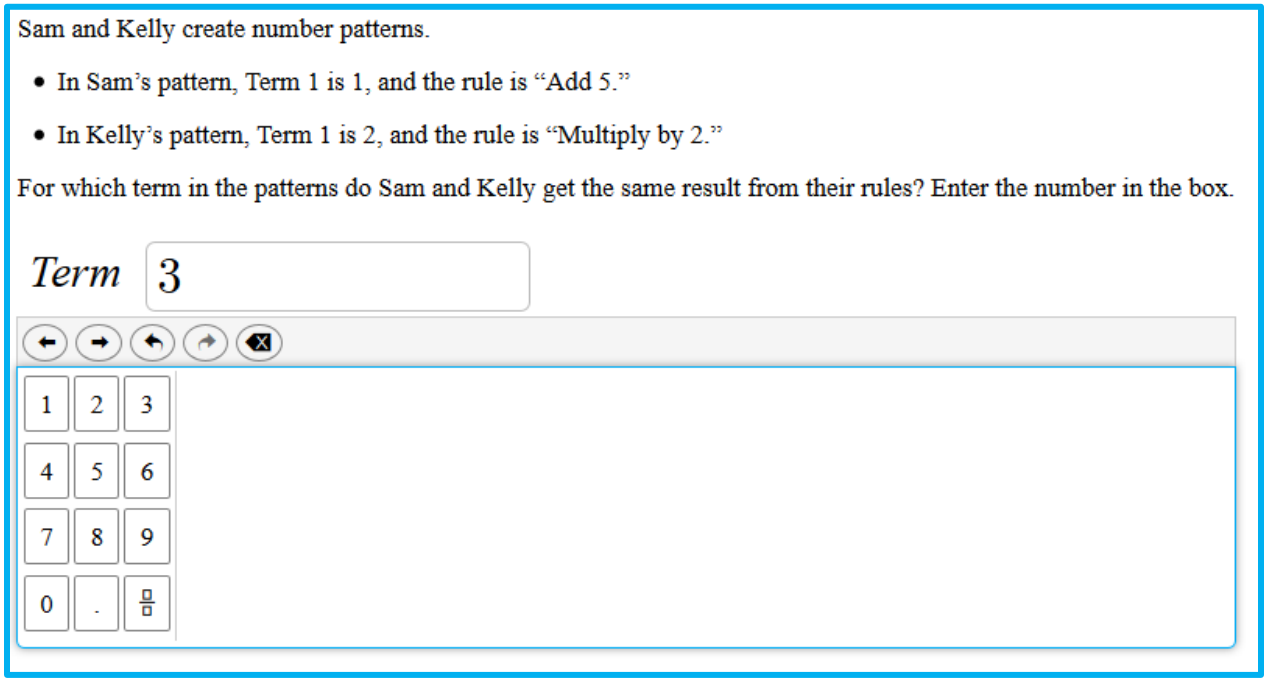
Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the term in both patterns where Sam and Kelly get the same result from their rules.

- The student gives the value of the term where Sam and Kelly get the same result instead of identifying the number of the term.

Term	Sam	Kelly
1	1	2
2	6	4
3	11	8
4	16	16
5	21	32

Sample Response: 0 points



Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the term in both patterns where Sam and Kelly get the same result from their rules.

- The student may start his or her patterns at Term 0 instead of at Term 1.

Term	Sam	Kelly
0	1	2
1	6	4
2	11	8
3	16	16
4	21	32

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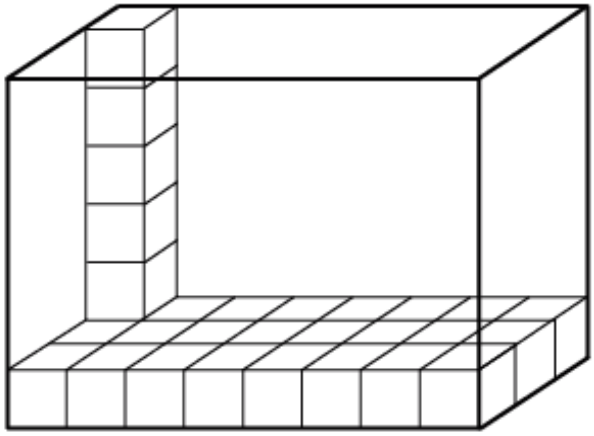
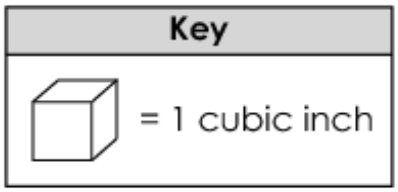
Question 15

Question and Scoring Guidelines

Question 15

A rectangular prism is partially filled with one layer and one column of cubes, as shown.





How many more cubes must be added to fill the prism with no gaps?

(A) 114 cubes

(B) 115 cubes

(C) 116 cubes

(D) 117 cubes

Points Possible: 1

Content Cluster: Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

Content Standard: Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. (*5.MD.4)*

Scoring Guidelines

Rationale for Option A: This is incorrect. The student may count the corner cube twice.

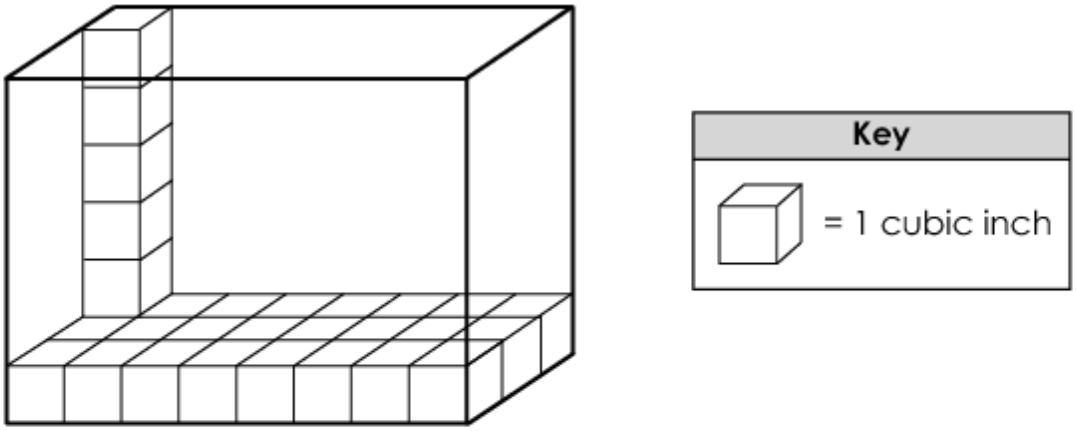
Rationale for Option B: **Key** – The student correctly calculates the number of cubes needed.

Rationale for Option C: This is incorrect. The student may subtract the corner cube twice.

Rationale for Option D: This is incorrect. The student may attempt to estimate the number of cubes.

Sample Response: 1 point

A rectangular prism is partially filled with one layer and one column of cubes, as shown.



How many more cubes must be added to fill the prism with no gaps?

- (A) 114 cubes
- ● 115 cubes
- (C) 116 cubes
- (D) 117 cubes

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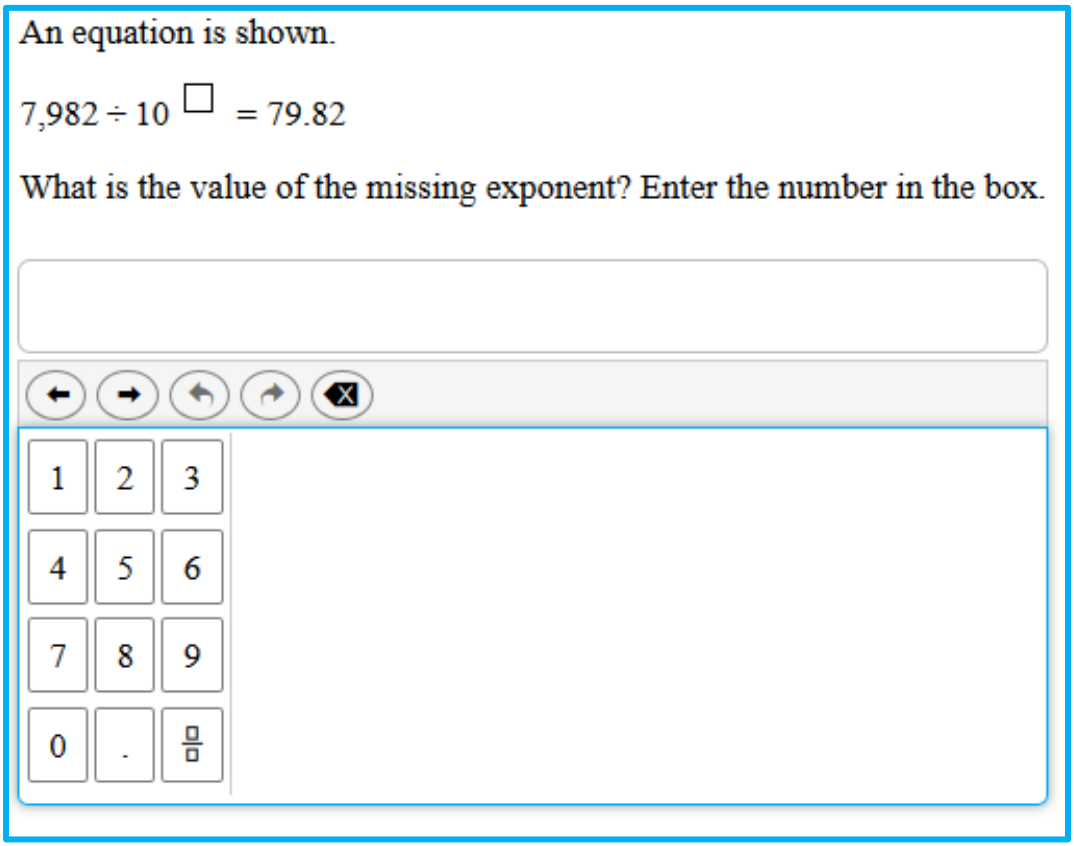
Question 16

Question and Scoring Guidelines

Question 16



Points Possible: 1

Content Cluster: Understand the place value system.

Content Standard: Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. *(5.NBT.2)*

Scoring Guidelines

Exemplar Response

- 2

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- The correct number (1 point).

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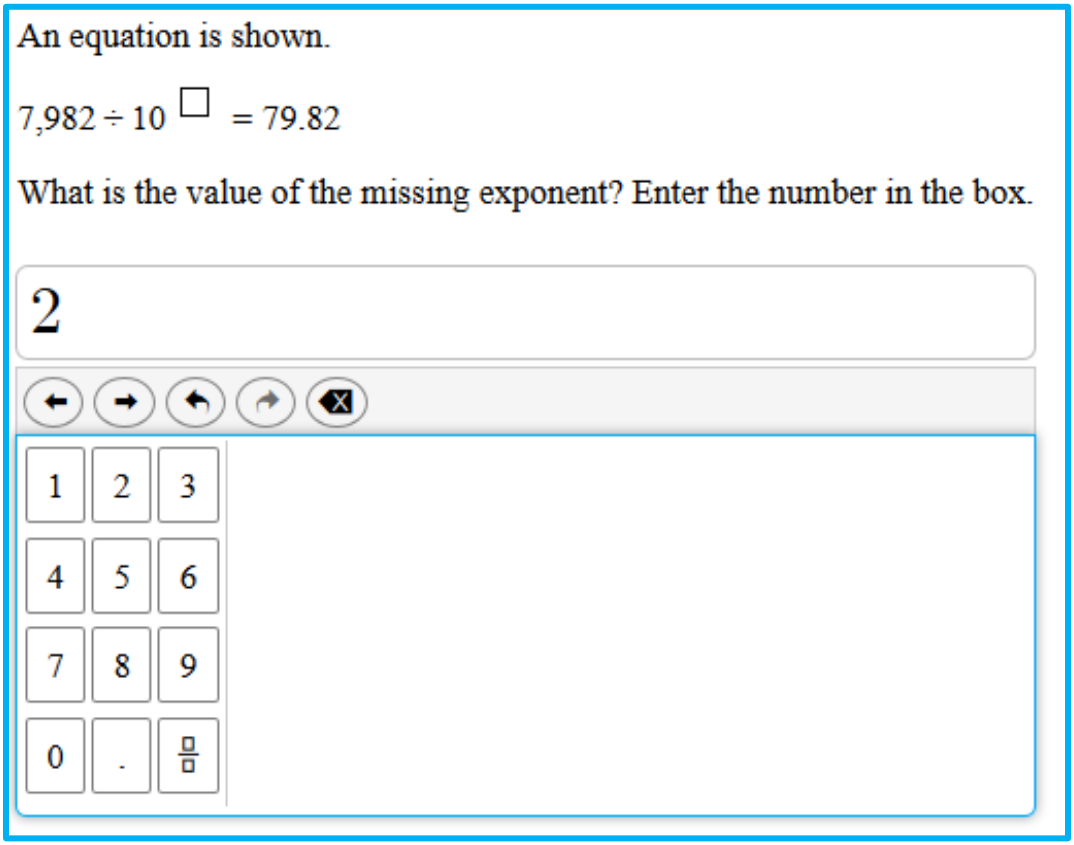
Question 16

Sample Responses

Sample Response: 1 point



Notes on Scoring

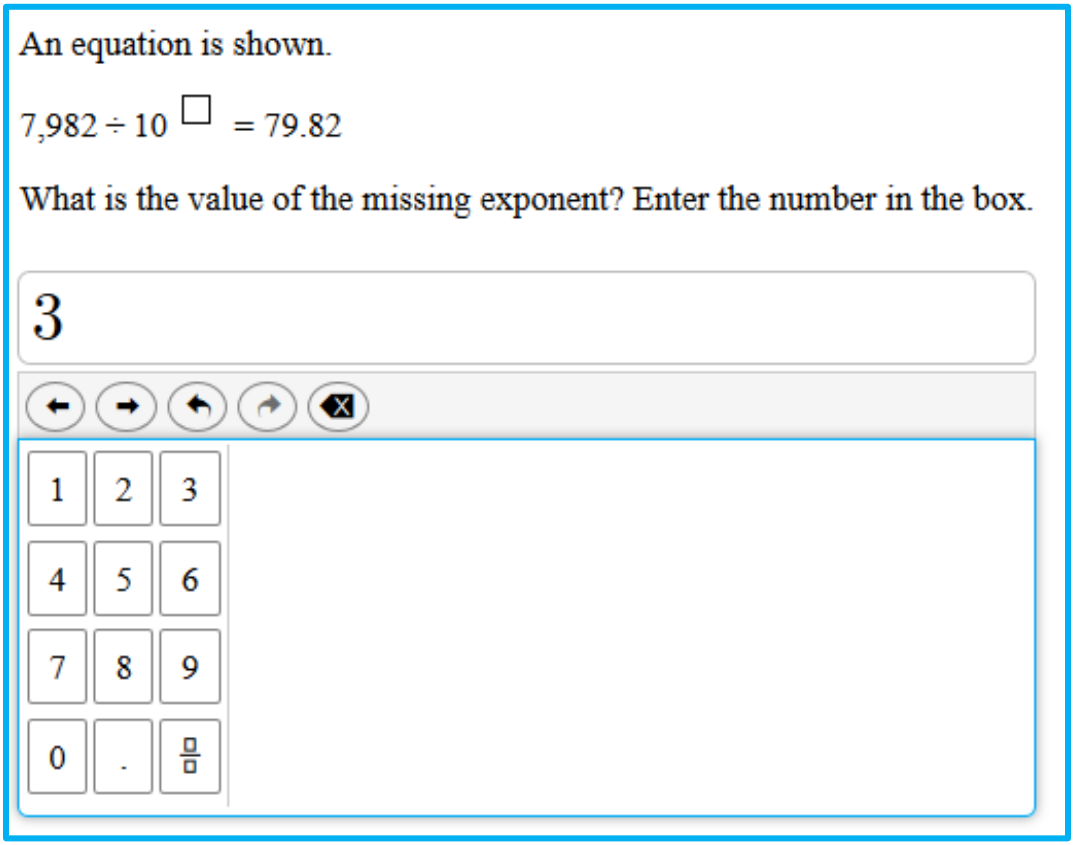
This response earns full credit (1 point) because it correctly identifies the value of the missing exponent.

$10^2 = 10 \times 10 = 100$

$7{,}982 \div 100 = 79.82$

$7{,}982 \div 10^2 = 79.82$

Sample Response: 0 points



Notes on Scoring

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

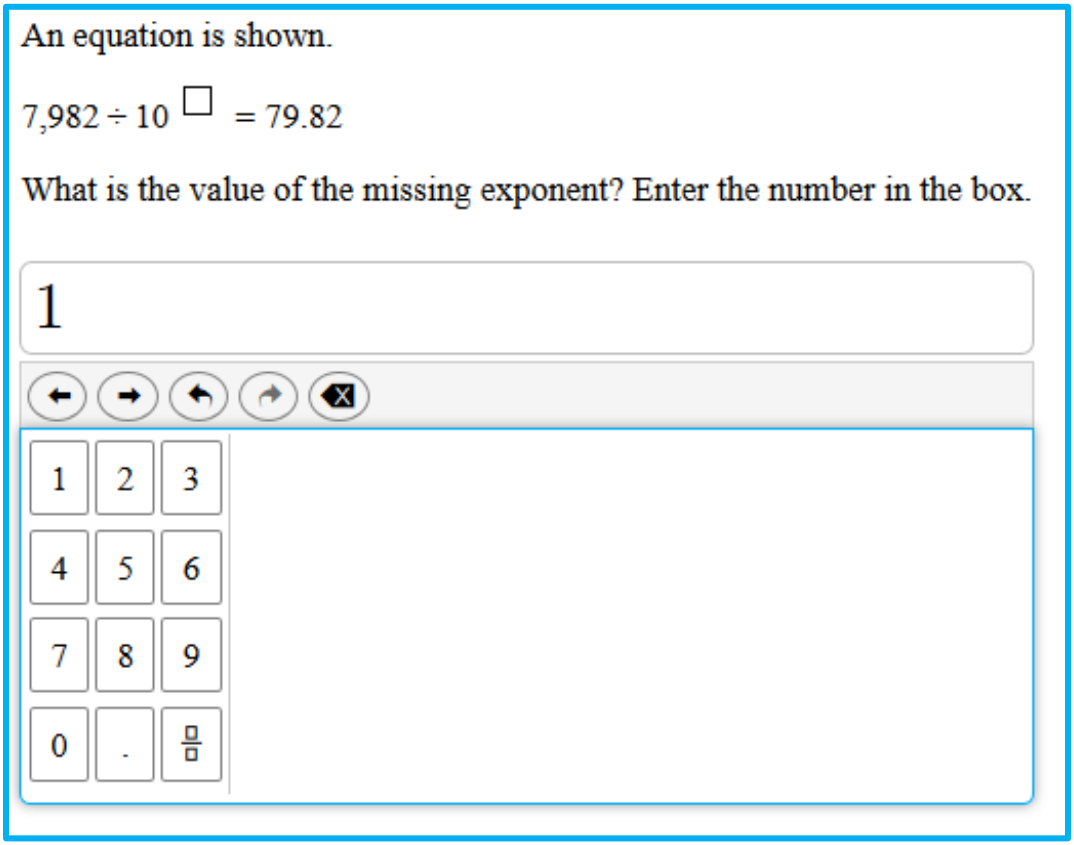
$10^3 = 10 \times 10 \times 10 = 1{,}000$

$7{,}982 \div 1{,}000 = 7.982$

$7{,}982 \div 10^3 = 7.982$

$7{,}982 \div 10^3 \neq 79.82$

Sample Response: 0 points



Notes on Scoring

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

$10^1 = 10$

$7{,}982 \div 10 = 798.2$

$7{,}982 \div 10^1 = 798.2$

$7{,}982 \div 10^1 \neq 79.82$

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Question 17

Question and Scoring Guidelines

Question 17

A student measured her height to be 51 inches.

Enter the student's height in feet and inches.

Height:		feet		inches

Points Possible: 1

Content Cluster: Convert like measurement units within a given measurement system.

Content Standard: Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. *(5.MD.1)*

Scoring Guidelines

Exemplar Response

Height:	4	feet	3	inches

Other Correct Responses

- N/A

For this item, a full-credit response includes:

- A correct response (1 point).

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Question 17

Sample Responses

Sample Response: 1 point

A student measured her height to be 51 inches.

Enter the student's height in feet and inches.

Height:	4	feet	3	inches

Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the student's height in feet and inches.

- The student may use division and interpret the remainder to identify the height in feet and inches.

  12 inches = 1 foot

$$\begin{array}{r} 4 \text{ r. } 3 \\ 12\overline{)\,51} \\ \underline{-48} \\ 3 \end{array}$$

  51 inches ÷ 12 inches = 4 feet remainder 3 inches

Sample Response: 1 point

A student measured her height to be 51 inches.

Enter the student's height in feet and inches.

Height:	4.0	feet	3.0	inches

Notes on Scoring

This response earns full credit (1 point) because it correctly identifies the student's height in feet and inches.

- The student may use a table to identify the height in feet and inches.

Inches	Foot/Feet
12.0	1.0
24.0	2.0
36.0	3.0
48.0	4.0
60.0	5.0

48.0 inches = 4.0 feet

51.0 inches – 48.0 inches = 3.0 inches

51.0 inches = 4.0 feet and 3.0 inches

Sample Response: 0 points

A student measured her height to be 51 inches.

Enter the student's height in feet and inches.

Height:	5	feet	1	inches

Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the student's height in feet and inches.

- The student may use an incorrect conversion from inches to feet to identify the height in feet and inches.

Inches ≠ Foot/Feet	
10	1
20	2
30	3
40	4
50	5

50 inches ≠ 5 feet

51 inches – 50 inches = 1 inch

51 inches ≠ 5 feet and 1 inch

Sample Response: 0 points

A student measured her height to be 51 inches.

Enter the student's height in feet and inches.

Height:	4.25	feet	0	inches

Notes on Scoring

This response earns no credit (0 points) because it incorrectly identifies the student's height in feet and inches.

- The student correctly identifies the number of feet but incorrectly identifies the number of inches.

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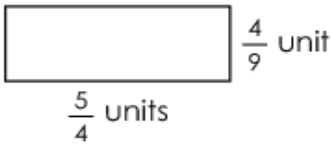
Question 18

Question and Scoring Guidelines

Question 18

Select the **three** rectangles that have an area of $\frac{20}{36}$ square unit.

- ☐  $\frac{4}{9}$ unit; $\frac{5}{4}$ units
- ☐  $\frac{4}{36}$ unit; $\frac{5}{36}$ unit
- ☐  $\frac{1}{2}$ unit; $\frac{20}{18}$ units
- ☐  $\frac{2}{3}$ unit; $\frac{10}{12}$ unit
- ☐  $\frac{10}{18}$ unit; $\frac{10}{18}$ unit

Points Possible: 1

Content Strand: Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Content Standard: Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas. *(5.NF.4b)*

Scoring Guidelines

Rationale for First Option: **Key** – The student correctly multiplies the numerators and denominators of the length and width.

Rationale for Second Option: This is incorrect. The student may multiply only the numerators and use the same denominator of the length and width.

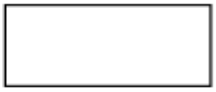
Rationale for Third Option: **Key** – The student correctly multiplies the numerators and denominators of the length and width.

Rationale for Fourth Option: **Key** – The student correctly multiplies the numerators and denominators of the length and width.

Rationale for Fifth Option: This is incorrect. The student may add the numerators and denominators of the length and width.

Sample Response: 1 point

Select the **three** rectangles that have an area of $\frac{20}{36}$ square unit.

- [x]  $\frac{4}{9}$ unit
  $\frac{5}{4}$ units
- [ ]  $\frac{4}{36}$ unit
  $\frac{5}{36}$ unit
- [x]  $\frac{1}{2}$ unit
  $\frac{20}{18}$ units
- [x]  $\frac{2}{3}$ unit
  $\frac{10}{12}$ unit
- [ ]  $\frac{10}{18}$ unit
  $\frac{10}{18}$ unit

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Question 19

Question and Scoring Guidelines

Question 19

An equation is shown.

$352 \div \square = 22$

What is the missing number?

(A) 14

(B) 15

(C) 16

(D) 17

Points Possible: 1

Content Cluster: Perform operations with multi-digit whole numbers and with decimals to hundredths.

Content Standard: Find whole-number quotients of whole numbers with up to four-digit dividends and two-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. *(5.NBT.6)*

Scoring Guidelines

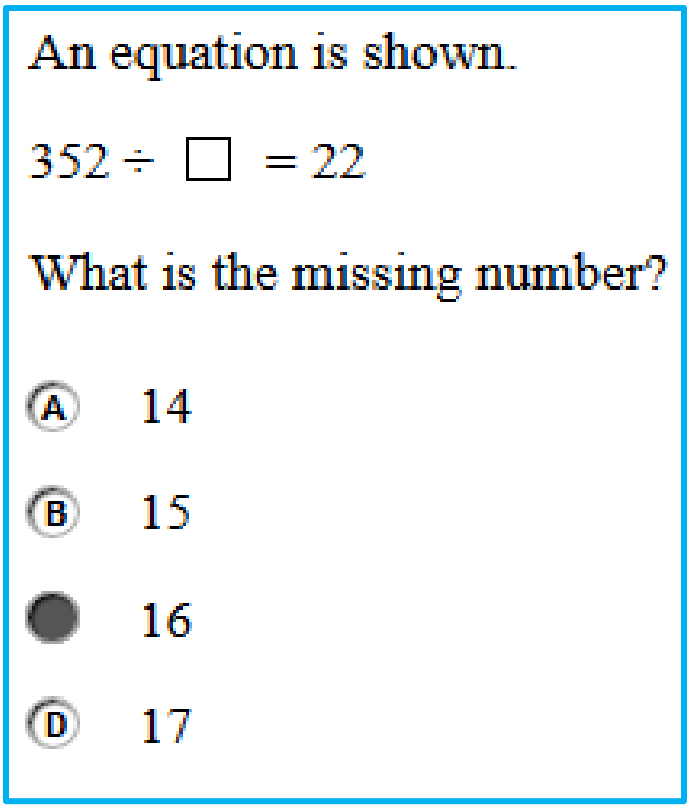
Rationale for Option A: This is incorrect. The student may miscalculate the value of the missing number in the equation.

Rationale for Option B: This is incorrect. The student may be off by one value when finding the missing number.

Rationale for Option C: **Key** – The student correctly identifies the value that goes in the box.

Rationale for Option D: This is incorrect. The student may think the value of the missing number is one greater than the actual value.

Sample Response: 1 point



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Question 20

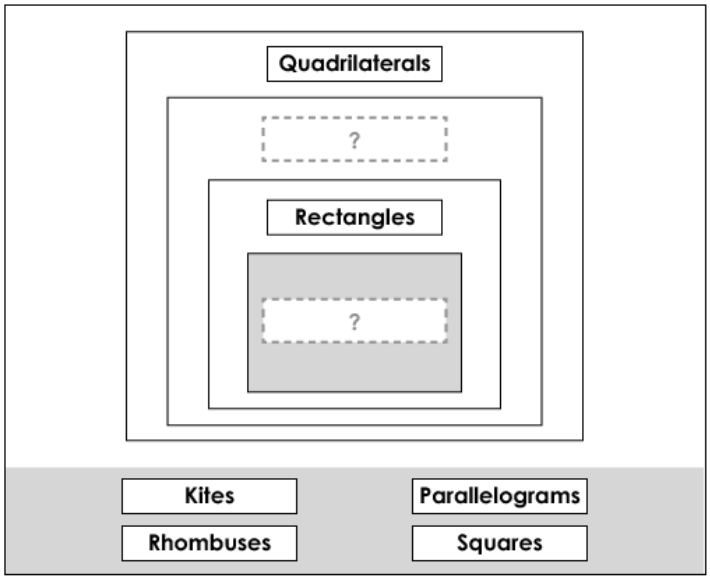
Question and Scoring Guidelines

Question 20

A partially completed diagram representing how shapes are related is shown.

Move shape labels into the blank boxes to show a correct relationship between four shapes.

- Use only **one** shape label in each blank box you fill in.
- You may **not** need to use all of the shape labels.



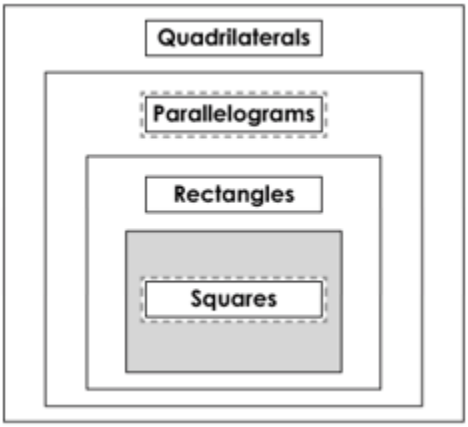
Points Possible: 1

Content Cluster: Classify two-dimensional figures into categories based on their properties.

Content Standard: Classify two-dimensional figures in a hierarchy based on properties. *(5.G.4)*

Scoring Guidelines

Exemplar Response



Other Correct Responses

- N/A

For this item, a full-credit response includes:

- A correct response (1 point).

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Question 20

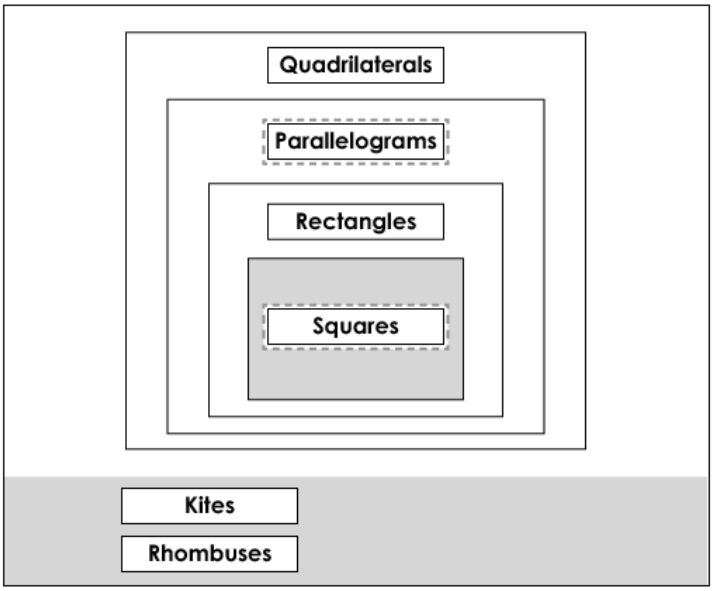
Sample Responses

Sample Response: 1 point

A partially completed diagram representing how shapes are related is shown.

Move shape labels into the blank boxes to show a correct relationship between four shapes.

- Use only **one** shape label in each blank box you fill in.
- You may **not** need to use all of the shape labels.



Notes on Scoring

This response earns full credit (1 point) because it correctly completes the diagram to show how each of the shapes are related.

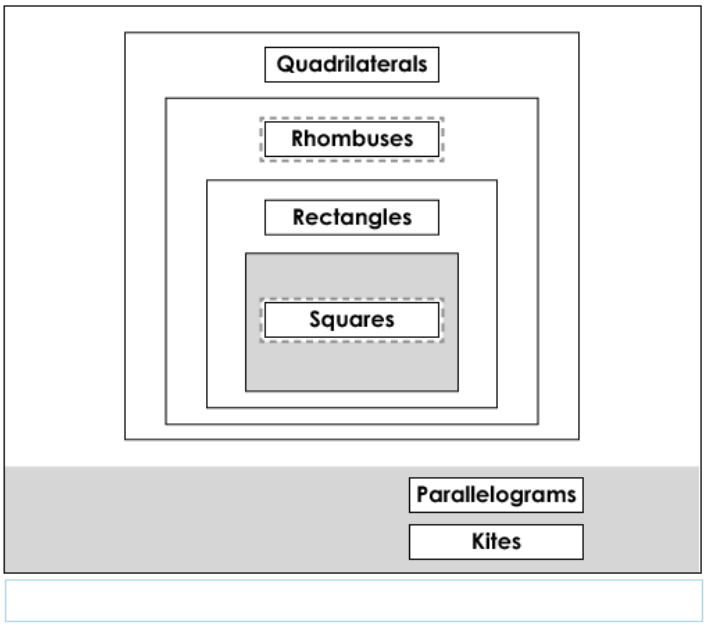
- The student correctly recognizes that all squares are rectangles, all rectangles are parallelograms and all parallelograms are quadrilaterals.

Sample Response: 0 points

A partially completed diagram representing how shapes are related is shown.

Move shape labels into the blank boxes to show a correct relationship between four shapes.

- Use only **one** shape label in each blank box you fill in.
- You may **not** need to use all of the shape labels.



Notes on Scoring

This response earns no credit (0 points) because it incorrectly completes the diagram to show how each of the shapes are related.

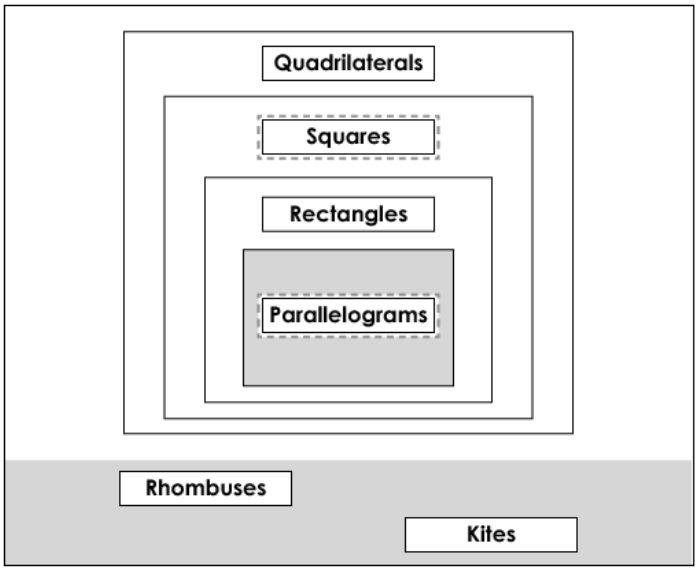
- The student correctly recognizes that all squares are rectangles; however, the student incorrectly recognizes that all rectangles are not rhombuses.

Sample Response: 0 points

A partially completed diagram representing how shapes are related is shown.

Move shape labels into the blank boxes to show a correct relationship between four shapes.

- Use only **one** shape label in each blank box you fill in.
- You may **not** need to use all of the shape labels.



Notes on Scoring

This response earns no credit (0 points) because it incorrectly completes the diagram to show how each of the shapes are related.

- The student incorrectly recognizes that all parallelograms are not rectangles and that all rectangles are not squares.