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## Grade 7 Math
### Spring 2017 Item Release
#### Content Summary and Answer Key

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<tr>
<td>1</td>
<td>Multiple Choice</td>
<td>Draw, construct, and describe geometrical figures and describe the relationships between them.</td>
<td>Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. (7.G.3)</td>
<td>B</td>
<td>1 point</td>
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<tr>
<td>2</td>
<td>Equation Item</td>
<td>Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.</td>
<td>Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. (7.NS.2) c. Apply properties of operations as strategies to multiply and divide rational numbers.</td>
<td>---</td>
<td>1 point</td>
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<tr>
<td>3</td>
<td>Multi-Select Item</td>
<td>Use properties of operations to generate equivalent expressions.</td>
<td>Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. (7.EE.1)</td>
<td>B, C, E</td>
<td>1 point</td>
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## Grade 7 Math
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<tr>
<td>4</td>
<td>Equation Item</td>
<td>Solve real-life and mathematical problems using numerical and algebraic expressions and equations.</td>
<td>Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. <em>(7.EE.4)</em>&lt;br&gt;a. Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</td>
<td>---</td>
<td>1 point</td>
</tr>
<tr>
<td>5</td>
<td>Multiple Choice</td>
<td>Investigate chance processes and develop, use, and evaluate probability models.</td>
<td>Find probabilities of compound events using organized lists, tables, tree diagrams, and simulations. <em>(7.SP.8)</em>&lt;br&gt;b. Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. For an event described in everyday language, e.g., “rolling double sixes,” identify the outcomes in the sample space which compose the event.</td>
<td>D</td>
<td>1 point</td>
</tr>
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| 6           | Graphic Response Item | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. | Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. (7.NS.1)  
  c. Understand subtraction of rational numbers as adding the additive inverse, \( p - q = p + (-q) \). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. | ---         | 1 point |
| 7           | Equation Item       | Investigate chance processes and develop, use, and evaluate probability models. | Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. (7.SP.7)  
  b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies? | ---         | 1 point |
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<tr>
<td>8</td>
<td>Equation Item</td>
<td>Investigate chance processes and develop, use, and evaluate probability models.</td>
<td>Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event; a probability around ( \frac{1}{2} ) indicates an event that is neither unlikely nor likely; and a probability near 1 indicates a likely event. (7.SP.5)</td>
<td>---</td>
<td>1 point</td>
</tr>
<tr>
<td>9</td>
<td>Equation Item</td>
<td>Investigate chance processes and develop, use, and evaluate probability models.</td>
<td>Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. (7.SP.7) a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.</td>
<td>---</td>
<td>1 point</td>
</tr>
<tr>
<td>10</td>
<td>Equation Item</td>
<td>Analyze proportional relationships and use them to solve real-world and mathematical problems.</td>
<td>Recognize and represent proportional relationships between quantities. (7.RP.2) b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.</td>
<td>---</td>
<td>1 point</td>
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<tr>
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<tr>
<td>11</td>
<td>Multiple Choice</td>
<td>Analyze proportional relationships and use them to solve real-world and mathematical problems.</td>
<td>Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $(\frac{1}{2})/(\frac{1}{4})$ miles per hour, equivalently 2 miles per hour. (7.RP.1)</td>
<td>C</td>
<td>1 point</td>
</tr>
<tr>
<td>12</td>
<td>Graphic Response Item</td>
<td>Analyze proportional relationships and use them to solve real-world and mathematical problems.</td>
<td>Recognize and represent proportional relationships between quantities. (7.RP.2) d. Explain what a point $(x, y)$ on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where $r$ is the unit rate.</td>
<td>---</td>
<td>1 point</td>
</tr>
<tr>
<td>13</td>
<td>Multiple Choice</td>
<td>Analyze proportional relationships and use them to solve real-world and mathematical problems.</td>
<td>Recognize and represent proportional relationships between quantities. (7.RP.2) a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.</td>
<td>B</td>
<td>1 point</td>
</tr>
<tr>
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<tr>
<td>14</td>
<td>Equation Item</td>
<td>Draw, construct, and describe geometrical figures and describe the relationships between them.</td>
<td>Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. (7.G.1)</td>
<td>---</td>
<td>1 point</td>
</tr>
<tr>
<td>15</td>
<td>Equation Item</td>
<td>Solve real-life and mathematical problems using numerical and algebraic expressions and equations.</td>
<td>Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example, if a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 ¾ inches long in the center of a door that is 27 ½ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation. (7.EE.3)</td>
<td>---</td>
<td>1 point</td>
</tr>
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<tr>
<td>16</td>
<td>Short Response</td>
<td>Analyze proportional relationships and use them to solve real-world and mathematical problems.</td>
<td>Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. (7.RP.3)</td>
<td>---</td>
<td>2 points</td>
</tr>
<tr>
<td>17</td>
<td>Equation Item</td>
<td>Solve real-life and mathematical problems involving angle measure, circles, area, surface area, and volume.</td>
<td>Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (7.G.6)</td>
<td>---</td>
<td>1 point</td>
</tr>
<tr>
<td>18</td>
<td>Multiple Choice</td>
<td>Draw informal comparative inferences about two populations.</td>
<td>Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book. (7.SP.4)</td>
<td>D</td>
<td>1 point</td>
</tr>
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<tr>
<td>19</td>
<td>Equation Item</td>
<td>Analyze proportional relationships and use them to solve real-world and mathematical problems.</td>
<td>Recognize and represent proportional relationships between quantities. <em>(7.RP.2)</em> b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.</td>
<td>---</td>
<td>1 point</td>
</tr>
<tr>
<td>20</td>
<td>Equation Item</td>
<td>Draw, construct, and describe geometrical figures and describe the relationships between them.</td>
<td>Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. <em>(7.G.1)</em></td>
<td>---</td>
<td>1 point</td>
</tr>
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Math
Spring 2017 Item Release

Question 1

Question and Scoring Guidelines
A right square pyramid is sliced through its apex and perpendicular to its base. What is the shape of the cross section that is the result of this action?

A square
B an isosceles triangle
C an isosceles trapezoid
D a non-isosceles trapezoid

Points Possible: 1

Content Cluster: Draw, construct, and describe geometrical figures and describe the relationships between them.

Content Standard: Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. (7.G.3)

Calculator Designation: Calculator neutral
Scoring Guidelines

Rationale for Option A: This is incorrect. The student may confuse the slice of a square pyramid perpendicular to the base and through its apex with a slice parallel to its base but not through its apex.

Rationale for Option B: Key – The student correctly visualizes the cross section resulting from a slice through the square pyramid perpendicular to its base and through its apex.

Rationale for Option C: This is incorrect. The student may visualize a slice perpendicular to the base of a square pyramid, but not through its apex.

Rationale for Option D: This is incorrect. The student may visualize a slice perpendicular to the base of a square pyramid, but not through its apex and thinks it will be a trapezoid in which the non-parallel sides would not be equal.

Sample Response: 1 point

A right square pyramid is sliced through its apex and perpendicular to its base. What is the shape of the cross section that is the result of this action?

A a square
B an isosceles triangle
C an isosceles trapezoid
D a non-isosceles trapezoid
Grade 7
Math
Spring 2017 Item Release

Question 2

Question and Scoring Guidelines
Question 2

An expression is shown.

2(−5.25)

What is the value of the expression?

Points Possible: 1

Content Cluster: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Content Standard: Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. (7.NS.2)

c. Apply properties of operations as strategies to multiply and divide rational numbers.

Calculator Designation: No calculator
Scoring Guidelines

Exemplar Response

- –10.5

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- The correct value (1 point).
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Math
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Question 2

Sample Responses
Sample Response: 1 point

An expression is shown.

$2(-5.25)$

What is the value of the expression?

$-10.5$

Notes on Scoring

This response earns full credit (1 point) because the student calculates the correct value of the expression.
Sample Response: 1 point

An expression is shown.

\[2(-5.25)\]

What is the value of the expression?

\[-10 \frac{1}{2}\]

Notes on Scoring

This response earns full credit (1 point) because the student calculates the correct value of the expression.
Sample Response: 0 points

An expression is shown.
2(−5.25)

What is the value of the expression?

10.5

Notes on Scoring
This response earns no credit (0 points) because the student does not calculate the correct value of the expression. The student may forget to apply the property of operations when multiplying rational numbers, resulting in a positive rather than a negative value.
Sample Response: 0 points

An expression is shown.

2(−5.25)

What is the value of the expression?

10.410

Notes on Scoring

This response earns no credit (0 points) because the student does not calculate the correct value of the expression. The student may multiply each digit in the parentheses by 2, getting 2 times 5 is 10, 2 times 2 is 4 and 2 times 5 is 10, resulting in 10.410. The student may also think that 2 times the negative sign results in a positive number, confusing this operation with multiplying two negative numbers.
Grade 7
Math
Spring 2017 Item Release

Question 3

Question and Scoring Guidelines
**Question 3**

Select the three expressions that are equivalent to \(-2(4 - 3x) + (5x - 2)\).

- [ ] \(2x - 10\)
- [ ] \(11x - 10\)
- [ ] \(-8 + 11x - 2\)
- [ ] \(-8 - 11x - 2\)
- [ ] \(-8 + 6x + 5x - 2\)
- [ ] \(-8 - 3x + 5x - 2\)

**Points Possible:** 1

**Content Strand:** Use properties of operations to generate equivalent expressions.

**Content Standard:** Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. (7.EE.1)

**Calculator Designation:** Calculator neutral
Scoring Guidelines

Rationale for First Option: This is incorrect. The student may not have distributed the –2 to the –3.

Rationale for Second Option: Key – The student correctly identifies that 11x – 10 represents the given expression with all like terms combined.

Rationale for Third Option: Key – The student correctly identifies that –8 + 11x – 2 represents the expression after distributing and combining the x-terms.

Rationale for Fourth Option: This is incorrect. The student may have incorrectly distributed or incorrectly added the x-terms to get –11x.

Rationale for Fifth Option: Key – The student correctly identifies the expression that represents distributing the –2 to the first two terms and leaving the rest of the expression the same.

Rationale for Sixth Option: This is incorrect. The student may not have distributed the –2 to the –3.

Sample Response: 1 point

Select the three expressions that are equivalent to –2(4 – 3x) + (5x – 2).

- [ ] 2x – 10
- [x] 11x – 10
- [x] –8 + 11x – 2
- [ ] –8 – 11x – 2
- [x] –8 + 6x + 5x – 2
- [ ] –8 – 3x + 5x – 2
Grade 7 Math
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Question 4

Question and Scoring Guidelines
Question 4

The perimeter of a regular 6-sided figure is 30 units, and the length of each side is \( x + 1 \) units.

What is the value of \( x \)?

Points Possible: 1

Content Cluster: Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Content Standard: Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (7.EE.4)

a. Solve word problems leading to equations of the form \( px + q = r \) and \( p(x + q) = r \), where \( p \), \( q \), and \( r \) are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

Calculator Designation: Calculator neutral
Scoring Guidelines

Exemplar Response

- 4

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- The correct value (1 point).
Sample Response: 1 point

The perimeter of a regular 6-sided figure is 30 units, and the length of each side is \( x + 1 \) units.

What is the value of \( x \)?

4

Notes on Scoring

This response earns full credit (1 point) because the student correctly calculates the value of \( x \).

\[
\frac{30}{6} = 5
\]

\[
x + 1 = 5
\]

\[
x = 5 - 1
\]

\[
x = 4
\]
Sample Response: 1 point

The perimeter of a regular 6-sided figure is 30 units, and the length of each side is \( x + 1 \) units.

What is the value of \( x \)?

\[
\frac{24}{6}
\]

Notes on Scoring

This response earns full credit (1 point) because the student correctly calculates the value of \( x \).

\[
\begin{align*}
6(x + 1) &= 30 \\
6x + 6 &= 30 \\
6x &= 30 - 6 \\
6x &= 24 \\
x &= \frac{24}{6}
\end{align*}
\]
Sample Response: 0 points

The perimeter of a regular 6-sided figure is 30 units, and the length of each side is $x + 1$ units.

What is the value of $x$?

6

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly calculate the value of $x$.

The student may add 6 to both sides of the equation instead of subtracting, as shown in the equations below.

$$6(x + 1) = 30$$

$$6x + 6 = 30$$  incorrectly adding 6 to the right side and eliminating the 6 on the left side

$$6x = 30 + 6$$

$$6x = 36$$

$$x = 6$$
Sample Response: 0 points

The perimeter of a regular 6-sided figure is 30 units, and the length of each side is \( x + 1 \) units.

What is the value of \( x \)?

4.8

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly calculate the value of \( x \).

The student may distribute the 6 only to the \( x \) in the parentheses and forget to distribute it to the 1.

\[
6(x + 1) = 30 \quad \text{incorrect distribution}
\]

\[
6x + 1 = 30
\]

\[
6x = 30 - 1
\]

\[
6x = 29
\]

\[
x = 4.8333 \ldots \text{rounding to the tenths}
\]

\[
x = 4.8
\]
Question 5

Question and Scoring Guidelines
**Question 5**

Arianna drives by a stop light near her home once every morning. The stop light has red, yellow, and green lights. She wants to know the probability of the light being red on two mornings.

Which list represents the sample space for two mornings at the stop light?

- A red, yellow, green
- B red, red, yellow/yellow, green/green
- C red/yellow, red/green, yellow/green, yellow/red, green/yellow, green/red
- D red/red, red/yellow, red/green, yellow/red, yellow/yellow, yellow/green, green/red, green/yellow, green/green

**Points Possible:** 1

**Content Strand:** Investigate chance processes and develop, use, and evaluate probability models.

**Content Standard:** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulations. (7.SP.8)

b. Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. For an event described in everyday language, e.g., “rolling double sixes,” identify the outcomes in the sample space which compose the event.

**Calculator Designation:** Calculator neutral

**Scoring Guidelines**

**Rationale for Option A:** This is incorrect. The student may choose the sample space that represents each possibility for the light once.

**Rationale for Option B:** This is incorrect. The student may think that only repeated lights are possible.

**Rationale for Option C:** This is incorrect. The student may think that no repeated lights are possible.

**Rationale for Option D:** **Key** – The student correctly chooses the correct sample space.
Sample Response: 1 point

Arianna drives by a stop light near her home once every morning. The stop light has red, yellow, and green lights. She wants to know the probability of the light being red on two mornings.

Which list represents the sample space for two mornings at the stop light?

A) red, yellow, green
B) red/red, yellow/yellow, green/green
C) red/yellow, red/green, yellow/green, yellow/red, green/yellow, green/red
D) red/red, red/yellow, red/green, yellow/red, yellow/yellow, yellow/green, green/red, green/yellow, green/green
Grade 7
Math
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Question 6

Question and Scoring Guidelines
Question 6

A number line is shown.
Select all of the points that are 7 units from point P on the number line.

Points Possible: 1

Content Cluster: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

Content Standard: Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. (7.NS.1) c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

Calculator Designation: Calculator neutral
Scoring Guidelines

Exemplar Response

Other Correct Responses

- N/A

For this item, a full-credit response includes:

- The two correct points selected (1 point).
Grade 7 Math
Spring 2017 Item Release

Question 6

Sample Responses
Sample Response: 1 point

A number line is shown.
Select all of the points that are 7 units from point P on the number line.

Notes on Scoring
This response earns full credit (1 point) because the student correctly selects the two points that are 7 units from point P on the number line.
Sample Response: 0 points

A number line is shown.

Select all of the points that are 7 units from point P on the number line.

Notes on Scoring

This response earns no credit (0 points) because the student only selects one of the two points that are 7 units from point P on the number line.
Sample Response: 0 points

A number line is shown.

Select all of the points that are 7 units from point P on the number line.

Notes on Scoring

This response earns no credit (0 points) because the student does not select the two points that are 7 units away from point P on the number line. Instead, the student incorrectly selects points (B) -7 and (E) 7 which are 7 units from zero on the number line.
Grade 7
Math
Spring 2017 Item Release

Question 7

Question and Scoring Guidelines
Question 7

Zayne has a bag filled with coins. The bag contains 7 quarters, 8 dimes, 3 nickels, and 9 pennies. He randomly chooses a coin from the bag. What is the probability that Zayne chooses a quarter or a nickel?

Points Possible: 1

Content Cluster: Investigate chance processes and develop, use, and evaluate probability models.

Content Standard: Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. (7.SP.7)
b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?

Calculator Designation: Calculator neutral
Scoring Guidelines

Exemplar Response

- $\frac{10}{27}$

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- A correct value (1 point).
Grade 7
Math
Spring 2017 Item Release

Question 7

Sample Responses
Sample Response: 1 point

Zayne has a bag filled with coins. The bag contains 7 quarters, 8 dimes, 3 nickels, and 9 pennies. He randomly chooses a coin from the bag. What is the probability that Zayne chooses a quarter or a nickel?

\[
\frac{10}{27}
\]

Notes on Scoring

This response earns full credit (1 point) because the student correctly calculates the probability. Ten of the twenty-seven coins are either quarters or nickels.
Sample Response: 0 points

Zayne has a bag filled with coins. The bag contains 7 quarters, 8 dimes, 3 nickels, and 9 pennies. He randomly chooses a coin from the bag. What is the probability that Zayne chooses a quarter or a nickel?

0.370

Notes on Scoring

This response earns no credit (0 points) because the student does not give the exact probability. The student may divide 10 by 27 and round to get 0.370.

When not instructed to round, students in grades 6 and higher are expected to respond with an exact value.
Sample Response: 0 points

Zayne has a bag filled with coins. The bag contains 7 quarters, 8 dimes, 3 nickels, and 9 pennies. He randomly chooses a coin from the bag.

What is the probability that Zayne chooses a quarter or a nickel?

\[
\frac{7}{27}
\]

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly calculate the probability. The student may give the probability that Zane chooses a quarter, not taking into consideration that the question asks for the probability of a quarter or a nickel being chosen.
Grade 7
Math
Spring 2017 Item Release

Question 8

Question and Scoring Guidelines
Question 8

Event Q is more likely to occur than event T. The probability of event T is \( \frac{1}{2} \).

What is a possible probability of event Q?

\[ P(Q) = \]

Points Possible: 1

Content Cluster: Investigate chance processes and develop, use, and evaluate probability models.

Content Standard: Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event; a probability around \( \frac{1}{2} \) indicates an event that is neither unlikely nor likely; and a probability near 1 indicates a likely event. (7.SP.5)

Calculator Designation: Calculator neutral
Scoring Guidelines

Exemplar Response

- $P(Q) = \frac{2}{3}$

Other Correct Responses

- Any value greater than 0.5 and less than or equal to 1

For this item, a full-credit response includes:

- A correct value (1 point).
Grade 7
Math
Spring 2017 Item Release

Question 8

Sample Responses
Sample Response: 1 point

Event Q is more likely to occur than event T. The probability of event T is \( \frac{1}{2} \).

What is a possible probability of event Q?

\[
P(Q) = \frac{2}{3}
\]

Notes on Scoring

This response earns full credit (1 point) because the student correctly responds with a probability greater than \( \frac{1}{2} \) but less than or equal to 1.
Sample Response: 1 point

Event Q is more likely to occur than event T. The probability of event T is $\frac{1}{2}$.

What is a possible probability of event Q?

$$P(Q) = 1$$

Notes on Scoring

This response earns full credit (1 point) because the student correctly responds with a probability greater than $\frac{1}{2}$ but less than or equal to 1.
Sample Response: 0 points

Event Q is more likely to occur than event T. The probability of event T is $\frac{1}{2}$.

What is a possible probability of event Q?

$$P(Q) = \frac{1}{2}$$

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly respond with a probability greater than $\frac{1}{2}$ but less than or equal to 1. The student may not understand that the probability of a chance event is a number between 0 and 1.
Sample Response: 0 points

Event Q is more likely to occur than event T. The probability of event T is $\frac{1}{2}$.

What is a possible probability of event Q?

$P(Q) = 0.051$

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly respond with a probability greater than $\frac{1}{2}$ but less than or equal to 1. The student may accidentally insert a 0 to the right of the decimal point.
Grade 7
Math
Spring 2017 Item Release

Question 9

Question and Scoring Guidelines
A gumball machine contains equal numbers of red, yellow, green, and blue gumballs. It randomly gives out one gumball for each pull at the machine.

What is the probability of getting a red or green gumball from one pull at the machine?

Points Possible: 1

Content Cluster: Investigate chance processes and develop, use, and evaluate probability models.

Content Standard: Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. (7.SP.7)

a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.

Calculator Designation: Calculator neutral
Scoring Guidelines

Exemplar Response

- $\frac{1}{2}$

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- The correct value (1 point).
Grade 7
Math
Spring 2017 Item Release

Question 9

Sample Responses
Sample Response: 1 point

A gumball machine contains equal numbers of red, yellow, green, and blue gumballs. It randomly gives out one gumball for each pull at the machine.

What is the probability of getting a red or green gumball from one pull at the machine?

\[
\frac{1}{2}
\]

Notes on Scoring

This response earns full credit (1 point) because the student correctly calculates the probability of getting a red or green gumball. Half of the gumballs are either red or green, which gives a probability of \( \frac{1}{2} \).
Sample Response: 1 point

A gumball machine contains equal numbers of red, yellow, green, and blue gumballs. It randomly gives out one gumball for each pull at the machine.

What is the probability of getting a red or green gumball from one pull at the machine?

\[ \frac{2}{4} \]

Notes on Scoring

This response earns full credit (1 point) because the student correctly shows the probability of getting a red or green gumball. Two out of four colors are red or green, which gives a probability of \( \frac{2}{4} \).
Sample Response: 0 points

A gumball machine contains equal numbers of red, yellow, green, and blue gumballs. It randomly gives out one gumball for each pull at the machine.

What is the probability of getting a red or green gumball from one pull at the machine?

\[ \frac{7}{12} \]

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly calculate the probability of getting a red or green gumball. The student may design a model with 3 gumballs of each color and miscount the red and green, counting 7 out of 12.
Notes on Scoring

This response earns no credit (0 points) because the student does not correctly calculate the probability of getting a red or green gumball. The student may find the probability for each color, \(\frac{1}{4}\), and then, because the question asks for two colors, multiply \(\frac{1}{4}\) by \(\frac{1}{4}\) to get \(\frac{1}{16}\), thereby calculating the probability of a compound event, e.g., first getting a red and then getting a green gumball.
Grade 7
Math
Spring 2017 Item Release

Question 10

Question and Scoring Guidelines
Question 10

A scientist records the number of deer observed in three areas of a forest. The table shows her observations.

<table>
<thead>
<tr>
<th>Area</th>
<th>Square Miles</th>
<th>Number of Deer</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>18</td>
<td>162</td>
</tr>
<tr>
<td>B</td>
<td>17</td>
<td>153</td>
</tr>
<tr>
<td>C</td>
<td>26</td>
<td>234</td>
</tr>
</tbody>
</table>

How many deer per square mile did the scientist observe in the forest?

Points Possible: 1

Content Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Content Standard: Recognize and represent proportional relationships between quantities. (7.RP.2)

b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

Calculator Designation: Calculator
Scoring Guidelines

Exemplar Response

- 9

Other Correct Responses

- Any equivalent value

For this item, a full-credit response includes:

- A correct value (1 point).
Grade 7
Math
Spring 2017 Item Release

Question 10

Sample Responses
Sample Response: 1 point

A scientist records the number of deer observed in three areas of a forest. The table shows her observations.

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<td>17</td>
<td>153</td>
</tr>
<tr>
<td>C</td>
<td>26</td>
<td>234</td>
</tr>
</tbody>
</table>

How many deer per square mile did the scientist observe in the forest?

9

Notes on Scoring

This response earns full credit (1 point) because the student correctly identifies the constant of proportionality, the number of deer per square mile, in the table.
Sample Response: 1 point

A scientist records the number of deer observed in three areas of a forest. The table shows her observations.

<table>
<thead>
<tr>
<th>Area</th>
<th>Square Miles</th>
<th>Number of Deer</th>
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</thead>
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<td>17</td>
<td>153</td>
</tr>
<tr>
<td>C</td>
<td>26</td>
<td>234</td>
</tr>
</tbody>
</table>

How many deer per square mile did the scientist observe in the forest?

\[
\frac{549}{61}
\]

Notes on Scoring

This response earns full credit (1 point) because the student correctly gives an equivalent value to the constant of proportionality, the number of deer per square mile, in the table.

In items describing a real-life context, students are encouraged to give a real-life response, which in this case would be 9 deer per square mile. In a real-world setting, it is unlikely that a practical answer would be \(\frac{549}{61}\) deer per square mile. This item is on the calculator part of the assessment, allowing the student to perform this calculation and express the unit rate in a realistic fashion.
Sample Response: 0 points

A scientist records the number of deer observed in three areas of a forest. The table shows her observations.

<table>
<thead>
<tr>
<th>Area</th>
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<th>Number of Deer</th>
</tr>
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<tr>
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</tr>
<tr>
<td>C</td>
<td>26</td>
<td>234</td>
</tr>
</tbody>
</table>

How many deer per square mile did the scientist observe in the forest?

27

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly identify the constant of proportionality, the number of deer per square mile, in the table. The student may calculate the correct number of deer, 9, then incorrectly multiply by 3, getting 27, since there are 3 areas in the table.
A scientist records the number of deer observed in three areas of a forest. The table shows her observations.

<table>
<thead>
<tr>
<th>Area</th>
<th>Square Miles</th>
<th>Number of Deer</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>B</td>
<td>17</td>
<td>153</td>
</tr>
<tr>
<td>C</td>
<td>26</td>
<td>234</td>
</tr>
</tbody>
</table>

How many deer per square mile did the scientist observe in the forest?

\[
\frac{61}{549}
\]

**Notes on Scoring**

This response earns no credit (0 points) because the student does not correctly give an equivalent value to the constant of proportionality, the number of deer per square mile, in the table. The response shows square miles per deer instead of deer per square mile.
Grade 7
Math
Spring 2017 Item Release

Question 11

Question and Scoring Guidelines
Question 11

A faucet drips $\frac{2}{3}$ gallon of water in 10 hours.

Which rate is the unit rate of water dripped per day?

A $\frac{1}{15}$ gallon per day

B $\frac{5}{18}$ gallon per day

C $1\frac{3}{5}$ gallons per day

D $6\frac{2}{3}$ gallons per day

Points Possible: 1

Content Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Content Standard: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $(\frac{1}{2})/(\frac{1}{4})$ miles per hour, equivalently 2 miles per hour. (7.RP.1)

Calculator Designation: Calculator
Scoring Guidelines

Rationale for Option A: This is incorrect. The student may find the unit rate of gallons per hour.

Rationale for Option B: This is incorrect. The student may multiply \( \frac{2}{3} \) by \( \frac{10}{24} \).

Rationale for Option C: Key – The student correctly divides \( \frac{2}{3} \) by \( \frac{10}{24} \) to find the unit rate in gallons per day.

Rationale for Option D: This is incorrect. The student may multiply \( \frac{2}{3} \) by 10.

Sample Response: 1 point

A faucet drips \( \frac{2}{3} \) gallon of water in 10 hours.

Which rate is the unit rate of water dripped per day?

A \( \frac{1}{15} \) gallon per day

B \( \frac{5}{18} \) gallon per day

C \( 1 \frac{3}{5} \) gallons per day

D \( 6 \frac{2}{3} \) gallons per day
Grade 7
Math
Spring 2017 Item Release
Question 12
Question and Scoring Guidelines
Question 12

At Olivia’s Burger House, each burger costs the same price. John buys 5 burgers for $7.50.

Place the point at the location on the graph that represents the unit price for 1 burger.

Points Possible: 1

Content Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Content Standard: Recognize and represent proportional relationships between quantities. (7.RP.2)

d. Explain what a point \((x, y)\) on the graph of a proportional relationship means in terms of the situation, with special attention to the points \((0, 0)\) and \((1, r)\) where \(r\) is the unit rate.

Calculator Designation: Calculator
Scoring Guidelines

Exemplar Response

Other Correct Responses

- N/A

For this item, a full-credit response includes:

- A correct point (1 point).
Grade 7
Math
Spring 2017 Item Release

Question 12

Sample Responses
Sample Response: 1 point

At Olivia's Burger House, each burger costs the same price. John buys 5 burgers for $7.50.

Place the point at the location on the graph that represents the unit price for 1 burger.

Notes on Scoring

This response earns full credit (1 point) because the student correctly places the point at (1, 1.50) on the graph to represent the unit price for 1 burger.
Sample Response: 0 points

At Olivia’s Burger House, each burger costs the same price. John buys 5 burgers for $7.50.

Place the point at the location on the graph that represents the unit price for 1 burger.

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly place the point on the graph to represent the unit price for 1 burger. The student places the point to represent that 1 burger costs $7.50. This is part of the information given in the item, that 5 burgers cost $7.50.
Sample Response: 0 points

At Olivia’s Burger House, each burger costs the same price. John buys 5 burgers for $7.50.

Place the point at the location on the graph that represents the unit price for 1 burger.

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly place the point on the graph to represent the unit price for 1 burger. The student places the point using the given information, 5 burgers cost $7.50, instead of at the location that represents the unit price for 1 burger.
Grade 7
Math
Spring 2017 Item Release

Question 13

Question and Scoring Guidelines
Question 13

Which table shows a proportional relationship?

A

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>25</td>
</tr>
</tbody>
</table>

B

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

C

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

D

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>

Points Possible: 1

Content Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Content Standard: Recognize and represent proportional relationships between quantities. (7.RP.2)
a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

Calculator Designation: Calculator
Scoring Guidelines

Rationale for Option A: This is incorrect. The student may sketch a graph of the points and incorrectly think they are on a straight line that passes through the origin.

Rationale for Option B: Key – The student selects the table of values in which all the pairs of x and y values have equivalent ratios and therefore shows a proportional relationship.

Rationale for Option C: This is incorrect. The student may identify a table of values with a linear relationship but does not verify that the pairs of x and y values have equivalent ratios.

Rationale for Option D: This is incorrect. The student may think that a proportional relationship implies that all the y-values are equal.

Sample Response: 1 point

![Image of tables showing a proportional relationship]
Grade 7
Math
Spring 2017 Item Release

Question 14

Question and Scoring Guidelines
An architect makes a scale drawing of a building. She uses the scale shown.

1 centimeter = 3 meters

The length of the building in the drawing is 11 centimeters.

What is the actual length, in meters, of the building?
Scoring Guidelines

Exemplar Response

- 33 meters

Other Correct Responses

- N/A

For this item, a full-credit response includes:

- The correct value (1 point).
Grade 7
Math
Spring 2017 Item Release

Question 14

Sample Responses
Sample Response: 1 point

An architect makes a scale drawing of a building. She uses the scale shown.

1 centimeter = 3 meters

The length of the building in the drawing is 11 centimeters.

What is the actual length, in meters, of the building?

33 meters

Notes on Scoring

This response earns full credit (1 point) because the student correctly calculates the actual length of the building.

11 times 3 equals 33.
Sample Response: 1 point

An architect makes a scale drawing of a building. She uses the scale shown.

1 centimeter = 3 meters

The length of the building in the drawing is 11 centimeters.

What is the actual length, in meters, of the building?

\[
\frac{33}{1} \text{ meters}
\]

Notes on Scoring

This response earns full credit (1 point) because the student correctly shows, with an equivalent fraction, the actual length of the building.

In items describing a real-world context, students are encouraged to give a real-world response, which in this case would be 33 meters. In a real-world setting, it is unlikely that somebody would answer the question with \( \frac{33}{1} \) meters.
Sample Response: 0 points

An architect makes a scale drawing of a building. She uses the scale shown.

1 centimeter = 3 meters

The length of the building in the drawing is 11 centimeters.

What is the actual length, in meters, of the building?

\[
\frac{11}{3} \quad meters
\]

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly calculate the actual length of the building. Instead of multiplying 11 by 3, the response shows division of the two numbers.
Sample Response: 0 points

An architect makes a scale drawing of a building. She uses the scale shown.
1 centimeter = 3 meters
The length of the building in the drawing is 11 centimeters.
What is the actual length, in meters, of the building?

3 meters

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly calculate the actual length of the building. Instead of multiplying 11 by 3, the student may divide 11 by 3 and truncate to the nearest whole number.
Grade 7
Math
Spring 2017 Item Release

Question 15

Question and Scoring Guidelines
Question 15

Points Possible: 1

Content Cluster: Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Content Standard: Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example, if a woman making $25 an hour gets a 10% raise, she will make an additional \( \frac{1}{10} \) of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9\( \frac{3}{4} \) inches long in the center of a door that is 27\( \frac{1}{2} \) inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.

(7.EE.3)

Calculator Designation: Calculator
Scoring Guidelines

Exemplar Response

- $226.57

Other Correct Responses

- N/A

For this item, a full-credit response includes:

- The correct value (1 point).
Grade 7
Math
Spring 2017 Item Release

Question 15

Sample Responses
Sample Response: 1 point

Michael has $317.89 in his bank account. He uses the money in his account to purchase new clothes for $48.73, lunch for $10.13, and a bike tire for $32.46.

How much money does Michael have left in his bank account after making the purchases?

$ 226.57

Notes on Scoring

This response earns full credit (1 point) because the student correctly calculates the amount of money left in the account.
Sample Response: 1 point

Michael has $317.89 in his bank account. He uses the money in his account to purchase new clothes for $48.73, lunch for $10.13, and a bike tire for $32.46.

How much money does Michael have left in his bank account after making the purchases?

$226.570

Notes on Scoring

This response earns full credit (1 point) because the student correctly calculates the amount of money left in the account.
Sample Response: 0 points

Michael has $317.89 in his bank account. He uses the money in his account to purchase new clothes for $48.73, lunch for $10.13, and a bike tire for $32.46.

How much money does Michael have left in his bank account after making the purchases?

$ 259.03

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly calculate the amount of money left in the account. The student may forget to subtract the cost of the bike tire.
Sample Response: 0 points

Michael has $317.89 in his bank account. He uses the money in his account to purchase new clothes for $48.73, lunch for $10.13, and a bike tire for $32.46. How much money does Michael have left in his bank account after making the purchases?

$ 227.57

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly calculate the amount of money left in the account. The student may calculate 317.89 minus 48.73 correctly to get 269.16, then correctly calculate 269.16 minus 10.13 to get 259.03. However, when subtracting 32.46, the student may forget to mark the regrouping of the 9 ones when exchanging one of them to 10 tenths, giving the result of the subtraction as 227.57.
Grade 7
Math
Spring 2017 Item Release

Question 16

Question and Scoring Guidelines
Question 16

Cait purchases a $20 item at a store. She uses a coupon to receive a 15% discount, and she pays a 6% sales tax on the item. She calculates the total cost, in dollars, of the item using the expression shown.

\[
\text{Cait's Expression} \quad (1.15)(1.06)(20)
\]

A. Describe the error in the expression Cait used for her calculation.

B. Show or explain how you would calculate the total cost of Cait's purchase.

Type your answers in the space provided.

Points Possible: 2

**Content Cluster:** Analyze proportional relationships and use them to solve real-world and mathematical problems.

**Content Standard:** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. (7.RP.3)

**Calculator Designation:** Calculator
## Scoring Guidelines

<table>
<thead>
<tr>
<th>Score Point</th>
<th>Description</th>
</tr>
</thead>
</table>
| 2 points    | Response includes the following:  
  - The correct description of the error (1 point).  
    AND  
  - The correct explanation of how to find the cost (1 point). |
| 1 point     | Response includes the following:  
  - The correct description of the error (1 point).  
    OR  
  - The correct explanation of how to find the cost (1 point). |
| 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 7
Math
Spring 2017 Item Release

Question 16

Sample Responses
Notes on Scoring

This response earns full credit (2 points) because the student gives a correct description of the error and shows a correct calculation of the total cost of the purchase.
Sample Response: 2 points

Cait purchases a $20 item at a store. She uses a coupon to receive a 15% discount, and she pays a 6% sales tax on the item. She calculates the total cost, in dollars, of the item using the expression shown.

\[
\text{Cait's Expression} \quad (1.15)(1.06)(20)
\]

A. Describe the error in the expression Cait used for her calculation.

B. Show or explain how you would calculate the total cost of Cait’s purchase.

Type your answers in the space provided.

Cait had an error in her expression because instead of using a 15% discount she made it 15% tax.
The way you would actually solve the problem would be \(20(0.85)1.06\). \(20 \times 0.85 = 17.17 \times 1.06 = 18.02\). Cait's total cost is $18.02.

Notes on Scoring

This response earns full credit (2 points) because the student gives a correct description of the error and shows a correct calculation of the total cost of the purchase.
Sample Response: 2 points

Cait purchases a $20 item at a store. She uses a coupon to receive a 15% discount, and she pays a 6% sales tax on the item. She calculates the total cost, in dollars, of the item using the expression shown.

Cait’s Expression

\[(1.15)(1.06)(20)\]

A. Describe the error in the expression Cait used for her calculation.
B. Show or explain how you would calculate the total cost of Cait’s purchase.
Type your answers in the space provided.

A. The 1.15 should be .15 because it is discount.
B. \[
x=20n=20/100\n\]
\[
x=17\n17/100\n=1706/100\n=1706/100\n\]

Notes on Scoring

This response earns full credit (2 points) because the student gives a correct description of the error and shows a correct calculation of the total cost of the purchase.
Sample Response: 1 point

Cait purchases a $20 item at a store. She uses a coupon to receive a 15% discount, and she pays a 6% sales tax on the item. She calculates the total cost, in dollars, of the item using the expression shown.

Cait’s Expression

\[(1.15)(1.06)(20)\]

A. Describe the error in the expression Cait used for her calculation.
B. Show or explain how you would calculate the total cost of Cait’s purchase.

Type your answers in the space provided.

She put a one in front of each coupon and sales tax when it should have been 0. What she should have done is multiply 20 by 0.15 to get 3 which you subtract from 20 to get 17. Then multiply 0.06 by 17 to get 1.02 and add that to 17 to get the answer $18.02

Notes on Scoring

This response earns partial credit (1 point) because the student shows a correct calculation of the total cost of the purchase. However, the student does not give a correct description of the error in the expression Cait used for her calculations.
Sample Response: 1 point

Cait purchases a $20 item at a store. She uses a coupon to receive a 15% discount, and she pays a 6% sales tax on the item. She calculates the total cost, in dollars, of the item using the expression shown.

Cait's Expression

\[(1.15)(1.06)(20)\]

A. Describe the error in the expression Cait used for her calculation.

B. Show or explain how you would calculate the total cost of Cait's purchase.

Type your answers in the space provided.

Cait is not correctly input the 15 percent discount. Instead of \(1.15\), the discount should have been \(0.85\). I would calculate the cost of Cait's purchase by using the expression \((1.15 \times 1.06)(20)\).

Notes on Scoring

This response earns partial credit (1 point) because the student gives a correct description of the error in the expression Cait used for her calculation, but shows an incorrect calculation of the total cost of the purchase.
Sample Response: 1 point

Cait purchases a $20 item at a store. She uses a coupon to receive a 15% discount, and she pays a 6% sales tax on the item. She calculates the total cost, in dollars, of the item using the expression shown.

Cait's Expression

\[(1.15)(1.06)(20)\]

A. Describe the error in the expression Cait used for her calculation.
B. Show or explain how you would calculate the total cost of Cait's purchase.
Type your answers in the space provided.

A. You wouldn't multiply 1.15 1.06 and 20.
B. Multiply by 0.15 = 3 Subtract 20 by 3 = 17 multiply by 0.06 = 1.02 + 17 = 18.02

Notes on Scoring

This response earns partial credit (1 point) because the student correctly calculates the total cost of the purchase, but does not describe the error in the expression Cait used for her calculation. “You wouldn’t multiply 1.15 1.06 and 20” is not specific enough to earn credit.

Note: In part B, “…0.06 = 1.02 + 17 = 18.02” is not mathematically correct. We encourage students to be very precise in their mathematical language and not to use multiple equal signs on one line when showing their work.
Sample Response: 0 points

Cait purchases a $20 item at a store. She uses a coupon to receive a 15% discount, and she pays a 6% sales tax on the item. She calculates the total cost, in dollars, of the item using the expression shown.

<table>
<thead>
<tr>
<th>Cait's Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1.15)(1.06)(20)</td>
</tr>
</tbody>
</table>

A. Describe the error in the expression Cait used for her calculation.

B. Show or explain how you would calculate the total cost of Cait's purchase.

Type your answers in the space provided.

A. The error in the expression is Cait didn’t go through with the order of operations and she didn’t include that you have to subtract 15 from all of the numbers.

B. I would do 20-15+6=11

Notes on Scoring

This response earns no credit (0 points) because the student does not give a correct description of the error in the expression Cait used for her calculation and shows an incorrect calculation of the total cost of the purchase.
Sample Response: 0 points

Cait purchases a $20 item at a store. She uses a coupon to receive a 15% discount, and she pays a 6% sales tax on the item. She calculates the total cost, in dollars, of the item using the expression shown.

Cait's Expression

\[(1.15)(1.06)(20)\]

A. Describe the error in the expression Cait used for her calculation.
B. Show or explain how you would calculate the total cost of Cait's purchase.
Type your answers in the space provided.

The error Cait used is she put a one in front of the percentages.
I would take 0.15 times 0.6 times twenty.

Notes on Scoring

This response earns no credit (0 points) because the student does not give a correct description of the error in the expression Cait used for her calculation and shows an incorrect calculation of the total cost of the purchase.
Sample Response: 0 points

Cait purchases a $20 item at a store. She uses a coupon to receive a 15% discount, and she pays a 6% sales tax on the item. She calculates the total cost, in dollars, of the item using the expression shown.

<table>
<thead>
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<tbody>
<tr>
<td>(1.15)(1.06)(20)</td>
</tr>
</tbody>
</table>

A. Describe the error in the expression Cait used for her calculation.
B. Show or explain how you would calculate the total cost of Cait’s purchase.

Type your answers in the space provided.

Cait didn’t multiply the percents by her twenty dollars, which made her get a different amount of money for the percents. She wants to multiply her cost when she should add them. If you multiply her costs together you get $32.21 which is wrong. The actual way to solve the problem is to multiply the percents by your $20 which will give you the cost of the percents. 15% = $3.00 and 6% = $1.20. Then you need to add, $20.00 + $3.00 = $1.20. You get a total of $34.20.

Notes on Scoring

This response earns no credit (0 points) because the student does not give a correct description of the error in the expression Cait used for her calculation and shows an incorrect calculation of the total cost of the purchase.
Grade 7
Math
Spring 2017 Item Release

Question 17

Question and Scoring Guidelines
Question 17

A container in the shape of a rectangular prism holds 651.168 cubic inches when completely filled with water. The container has a length of 12.6 inches and a width of 15.2 inches.

What is the height, in inches, of the container?

points possible: 1

Content Cluster: Solve real-life and mathematical problems involving angle measure, circles, area, surface area, and volume.

Content Standard: Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (7.G.6)

Calculator Designation: Calculator
Scoring Guidelines

Exemplar Response

- 3.4 inches

Other Correct Responses

- N/A

For this item, a full-credit response includes:

- The correct value (1 point).
Grade 7
Math
Spring 2017 Item Release

Question 17

Sample Responses
Sample Response: 1 point

A container in the shape of a rectangular prism holds 651.168 cubic inches when completely filled with water. The container has a length of 12.6 inches and a width of 15.2 inches. What is the height, in inches, of the container?

3.4 inches

Notes on Scoring

This response earns full credit (1 point) because the student correctly calculates the height of the container.

\[651.168 \div 12.6 = 51.68\]
\[51.68 \div 15.2 = 3.4\]
Sample Response: 1 point

A container in the shape of a rectangular prism holds 651.168 cubic inches when completely filled with water. The container has a length of 12.6 inches and a width of 15.2 inches.

What is the height, in inches, of the container?

3.400 inches

Notes on Scoring

This response earns full credit (1 point) because the student correctly calculates the height of the container.
Sample Response: 0 points

A container in the shape of a rectangular prism holds 651.168 cubic inches when completely filled with water. The container has a length of 12.6 inches and a width of 13.2 inches.

What is the height, in inches, of the container?

```
623.368 inches
```

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly calculate the height of the container. The student may subtract the length and width from the volume instead of dividing by these numbers.
Sample Response: 0 points

A container in the shape of a rectangular prism holds 651.168 cubic inches when completely filled with water. The container has a length of 12.6 inches and a width of 15.2 inches.

What is the height, in inches, of the container?

1.7 inches

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly calculate the height of the container. The student may divide correctly by both 12.6 and 15.2, but then may also divide by 2.
Grade 7
Math
Spring 2017 Item Release

Question 18

Question and Scoring Guidelines
Question 18

The leaders of two youth sports teams randomly select five members of each team and record their ages, as shown.
- Team A: 16, 13, 12, 16, 13
- Team B: 10, 13, 16, 16, 10

Which statement appropriately compares the ages of the team members?

A. Members of Team A and members of Team B are likely the same average (mean) age.
B. Members of Team A are likely younger, and they have less variability in their ages.
C. Members of Team A are likely older, and they have more variability in their ages.
D. Members of Team A are likely older, and they have less variability in their ages.

Points Possible: 1

Content Cluster: Draw informal comparative inferences about two populations.

Content Standard: Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book. (7.SP.4)

Calculator Designation: Calculator
Scoring Guidelines

Rationale for Option A: This is incorrect. The student may use the median instead of the mean to compare the ages.

Rationale for Option B: This is incorrect. The student may correctly compare the ranges of the teams, but incorrectly compares the average ages.

Rationale for Option C: This is incorrect. The student may correctly compare the average ages of the teams, but incorrectly compares the ranges.

Rationale for Option D: Key – The student correctly compares the average ages and ranges of the two teams.

Sample Response: 1 point

The leaders of two youth sports teams randomly select five members of each team and record their ages, as shown.

- Team A: 16, 13, 12, 16, 13
- Team B: 10, 13, 16, 16, 10

Which statement appropriately compares the ages of the team members?

A. Members of Team A and members of Team B are likely the same average (mean) age.
B. Members of Team A are likely younger, and they have less variability in their ages.
C. Members of Team A are likely older, and they have more variability in their ages.
D. Members of Team A are likely older, and they have less variability in their ages.
Grade 7
Math
Spring 2017 Item Release

Question 19

Question and Scoring Guidelines
A grocery store sells an 8-ounce bottle of juice for $1.76.
What is the cost of the juice per ounce?

Points Possible: 1

Content Cluster: Analyze proportional relationships and use them to solve real-world and mathematical problems.

Content Standard: Recognize and represent proportional relationships between quantities. (7.RP.2)
b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

Calculator Designation: Calculator
Scoring Guidelines

Exemplar Response

- $0.22

Other Correct Responses

- N/A

For this item, a full-credit response includes:

- The correct value (1 point).
Grade 7
Math
Spring 2017 Item Release

Question 19

Sample Responses
Sample Response: 1 point

A grocery store sells an 8-ounce bottle of juice for $1.76.
What is the cost of the juice per ounce?

$ 0.22

Notes on Scoring

This response earns full credit (1 point) because the student correctly calculates the unit rate, the cost of the juice per ounce.
$1.76 \div 8 = 0.22$
Sample Response: 1 point

A grocery store sells an 8-ounce bottle of juice for $1.76.
What is the cost of the juice per ounce?

\[
\frac{1.76}{8}
\]

Notes on Scoring

This response earns full credit (1 point) because the student shows a fraction equivalent to the unit rate, the cost of the juice per ounce.

In items describing a real-world context, students are encouraged to give a real-world response, which in this case would be $0.22. In a real-world setting, it is not practical to answer this question with 1.76 eighths dollar per ounce of juice. This item is on the calculator part of the assessment, allowing the student to perform the calculation and express the unit rate in a realistic fashion.
Sample Response: 0 points

A grocery store sells an 8-ounce bottle of juice for $1.76.
What is the cost of the juice per ounce?

$ 22

Notes on Scoring
This response earns no credit (0 points) because the student does not correctly calculate the unit rate. The student may forget to consider the decimal point in $1.76.
Sample Response: 0 points

A grocery store sells an 8-ounce bottle of juice for $1.76.
What is the cost of the juice per ounce?

$ 14.08

Notes on Scoring

This response earns no credit (0 points) because the student does not correctly calculate the unit rate. The student may multiply the two numbers instead of dividing them.
Magdalena creates the scale drawing shown of a rectangular field.

3 cm

7.2 cm

<table>
<thead>
<tr>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 cm = 4.5 m</td>
</tr>
</tbody>
</table>

What is the area, in square meters ($m^2$), of the actual field?

$m^2$

Points Possible: 1

Content Cluster: Draw, construct, and describe geometrical figures and describe the relationships between them.

Content Standard: Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. (7.G.1)

Calculator Designation: Calculator
Scoring Guidelines

Exemplar Response

- 437.4 m$^2$

Other Correct Responses

- N/A

For this item, a full-credit response includes:

- The correct value (1 point).
Grade 7 Math
Spring 2017 Item Release

Question 20

Sample Responses
Magdalena creates the scale drawing shown of a rectangular field.

What is the area, in square meters (m$^2$), of the actual field?

437.4 m$^2$

Notes on Scoring
This response earns full credit (1 point) because the student uses the scale drawing to correctly compute the area of the actual field.
Sample Response: 1 point

Magdalena creates the scale drawing shown of a rectangular field.

![Scale drawing](image)

What is the area, in square meters \((m^2)\), of the actual field?

\[
437.40 \text{ m}^2
\]

Notes on Scoring

This response earns full credit (1 point) because the student uses the scale drawing to correctly compute the area of the actual field.
Notes on Scoring

This response earns no credit (0 points) because the student does not use the scale drawing to correctly compute the area of the actual field. The student may calculate the area of the scale drawing, 7.2 times 3 equals 21.6, then multiply by the scale factor, 4.5, not taking into consideration that 21.6 is an area rather than a linear measurement.
Sample Response: 0 points

Magdalena creates the scale drawing shown of a rectangular field.

\[ \begin{array}{c} \text{3 cm} \\ \text{7.2 cm} \end{array} \]

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1 cm = 4.5 m</td>
</tr>
</tbody>
</table>

What is the area, in square meters \((m^2)\), of the actual field?

\[ \boxed{21.6 \ m^2} \]

Notes on Scoring

This response earns no credit (0 points) because the student does not use the scale drawing to correctly compute the area of the actual field. The student may calculate the area of the scale drawing and not take into consideration the actual measurements of the field.