Ohio’s State Tests

ITEM RELEASE

SPRING 2019

GRADE 3

MATHEMATICS
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## Grade 3 Math

### Spring 2019 Item Release

**Content Summary and Answer Key**

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<th>Points</th>
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<tbody>
<tr>
<td>9</td>
<td>Grid Item</td>
<td>Solve problems involving money, measurement and estimation of intervals of time, liquid volumes, and masses of objects.</td>
<td>Work with time and money. (3.MD.1)</td>
<td>Level 2</td>
<td>---</td>
<td>1 point</td>
</tr>
<tr>
<td>10</td>
<td>Inline Choice Item</td>
<td>Develop understanding of fractions as numbers. Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.</td>
<td>Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b. (3.NF.1)</td>
<td>Level 2</td>
<td>---</td>
<td>1 point</td>
</tr>
<tr>
<td>11</td>
<td>Multiple Choice Item</td>
<td>Represent and interpret data.</td>
<td>Create scaled picture graphs to represent a data set with several categories. Create scaled bar graphs to represent a data set with several categories. Solve two-step “how many more” and “how many less” problems using information presented in the scaled graphs. For example, create a bar graph in which each square in the bar graph might represent 5 pets, then determine how many more/less in two given categories. (3.MD.3)</td>
<td>Level 2</td>
<td>C</td>
<td>1 point</td>
</tr>
<tr>
<td>12</td>
<td>Equation Item</td>
<td>Understand properties of multiplication and the relationship between multiplication and division.</td>
<td>Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8. (3.OA.6)</td>
<td>Level 2</td>
<td>---</td>
<td>1 point</td>
</tr>
</tbody>
</table>

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<tr>
<td>15</td>
<td>Table Item</td>
<td>Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. (Note: These standards are written with the convention that a × b means a groups of b objects each; however, because of the commutative property, students may also interpret 5 × 7 as the total number of objects in 7 groups of 5 objects each). (3.OA.1)</td>
<td>Level 3</td>
<td>---</td>
<td>1 point</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Multiple Choice Item</td>
<td>Relate area to the operations of multiplication and addition. (3.MD.7) c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c (represent the distributive property with visual models including an area model).</td>
<td>Level 2</td>
<td>C</td>
<td>1 point</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Equation Item</td>
<td>Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends. (3.OA.9)</td>
<td>Level 2</td>
<td>---</td>
<td>1 point</td>
<td></td>
</tr>
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<tbody>
<tr>
<td>25</td>
<td>Table Item</td>
<td>Use place value understanding and properties of operations to perform multi-digit arithmetic. A range of strategies and algorithms may be used.</td>
<td>Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. (3.NBT.2)</td>
<td>Level 2</td>
<td>---</td>
<td>1 point</td>
</tr>
<tr>
<td>27</td>
<td>Multi-Select Item</td>
<td>Geometric measurement: understand concepts of area and relate area to multiplication and to addition.</td>
<td>Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). (3.MD.6)</td>
<td>Level 2</td>
<td>A, D, E</td>
<td>1 point</td>
</tr>
</tbody>
</table>
| 28            | Multi-Interaction| Develop understanding of fractions as numbers. Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8. | Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.) (3.NF.3)  
d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. | Level 3            | ---        | 2 points |

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<tbody>
<tr>
<td>29</td>
<td>Equation Item</td>
<td>Use place value understanding and properties of operations to perform multi-digit arithmetic. A range of strategies and algorithms may be used.</td>
<td>Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations. (3.NBT.3)</td>
<td>Level 2</td>
<td>---</td>
<td>1 point</td>
</tr>
<tr>
<td>30</td>
<td>Equation Item</td>
<td>Represent and solve problems involving multiplication and division.</td>
<td>Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. See Table 2, page 96. Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.) (3.OA.3)</td>
<td>Level 3</td>
<td>---</td>
<td>1 point</td>
</tr>
<tr>
<td>31</td>
<td>Multiple Choice Item</td>
<td>Represent and interpret data.</td>
<td>Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by creating a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3.MD.4)</td>
<td>Level 1</td>
<td>A</td>
<td>1 point</td>
</tr>
</tbody>
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<tr>
<td>33</td>
<td>Equation Item</td>
<td>Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.</td>
<td>Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters. (3.MD.8)</td>
<td>Level 1</td>
<td>---</td>
<td>1 point</td>
</tr>
<tr>
<td>36</td>
<td>Equation Item</td>
<td>Use place value understanding and properties of operations to perform multi-digit arithmetic. A range of strategies and algorithms may be used.</td>
<td>Use place value understanding to round whole numbers to the nearest 10 or 100. (3.NBT.1)</td>
<td>Level 1</td>
<td>---</td>
<td>1 point</td>
</tr>
<tr>
<td>42</td>
<td>Multiple Choice Item</td>
<td>Develop understanding of fractions as numbers. Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.</td>
<td>Understand a fraction as a number on the number line; represent fractions on a number line diagram. (3.NF.2) a. Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.</td>
<td>Level 2</td>
<td>B</td>
<td>1 point</td>
</tr>
</tbody>
</table>

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### Spring 2019 Item Release
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<th>Points</th>
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<tr>
<td>45</td>
<td>Multi-Select Item</td>
<td>Understand properties of multiplication and the relationship between multiplication and division.</td>
<td>Apply properties of operations as strategies to multiply and divide. For example, if $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known (Commutative Property of Multiplication); $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$ (Associative Property of Multiplication); knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find $8 \times 7$ as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$ (Distributive Property). Students need not use formal terms for these properties. (3.OA.5)</td>
<td>Level 2</td>
<td>A, C</td>
<td>1 point</td>
</tr>
<tr>
<td>47</td>
<td>Multi-Select Item</td>
<td>Reason with shapes and their attributes.</td>
<td>Draw and describe triangles, quadrilaterals (rhombuses, rectangles, and squares), and polygons (up to 8 sides) based on the number of sides and the presence or absence of square corners (right angles). (3.G.1)</td>
<td>Level 1</td>
<td>C, E</td>
<td>1 point</td>
</tr>
<tr>
<td>48</td>
<td>Multiple Choice Item</td>
<td>Geometric measurement: understand concepts of area and relate area to multiplication and to addition.</td>
<td>Recognize area as an attribute of plane figures and understand concepts of area measurement. (3.MD.5) b. A plane figure which can be covered without gaps or overlaps by $n$ unit squares is said to have an area of $n$ square units.</td>
<td>Level 1</td>
<td>A</td>
<td>1 point</td>
</tr>
</tbody>
</table>

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Depth of Knowledge (DOK)

DOK refers to the complexity of thinking required to complete a task in a given item. Items with a DOK 1 designation focus on the recall of information, such as definitions and terms, and simple procedures. Items with a DOK 2 designation require students to make decisions, solve routine problems, perform calculations, or recognize patterns. Items with a DOK 3 designation feature higher-order cognitive tasks. These DOK 3 tasks include but are not limited to: critiquing a statement and forming a conclusion; explaining, justifying, or proving a statement; or approaching abstract, complex, open-ended, and non-routine problems. Each grade’s blueprint contains information about the number of points of opportunity students will encounter at each DOK level.

Table 1: Math Descriptors – Applying Depth of Knowledge Levels for Mathematics (Webb, 2002) & NAEP 2002 Mathematics Levels of Complexity

(M. Petit, Center for Assessment 2003, K. Hess, Center for Assessment, updated 2006)

<table>
<thead>
<tr>
<th>Level 1 Recall</th>
<th>Level 2 Skills/Concepts</th>
<th>Level 3 Strategic Thinking</th>
<th>Level 4 Extended Thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Recall, observe, or recognize a fact, definition, term, or property</td>
<td>a. Classify plane and three-dimensional figures</td>
<td>a. Interpret information from a complex graph</td>
<td>a. Relate mathematical concepts to other content areas</td>
</tr>
<tr>
<td>b. Apply/compute a well-known algorithm (e.g., sum, quotient)</td>
<td>b. Interpret information from a simple graph</td>
<td>b. Explain thinking when more than one response is possible</td>
<td>b. Relate mathematical concepts to real-world applications in new situations</td>
</tr>
<tr>
<td>c. Apply a formula</td>
<td>c. Use models to represent mathematical concepts</td>
<td>c. Make and/or justify conjectures</td>
<td>c. Apply a mathematical model to illuminate a problem, situation</td>
</tr>
<tr>
<td>d. Determine the area or perimeter of rectangles or triangles given a drawing and labels</td>
<td>d. Solve a routine problem requiring multiple steps/decision points, or the application of multiple concepts</td>
<td>d. Use evidence to develop logical arguments for a concept</td>
<td>d. Conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results</td>
</tr>
<tr>
<td>e. Identify a plane or three-dimensional figure</td>
<td>e. Compare and/or contrast figures or statements</td>
<td>e. Use concepts to solve non-routine problems</td>
<td>e. Design a mathematical model to inform and solve a practical or abstract situation</td>
</tr>
<tr>
<td>f. Measure</td>
<td>f. Construct 2-dimensional patterns for 3-dimensional models, such as cylinders and cones</td>
<td>f. Perform procedures with multiple steps and multiple decision points</td>
<td>f. Develop generalizations of the results obtained and the strategies used and apply them to new problem situations</td>
</tr>
<tr>
<td>g. Perform a specified or routine procedure (e.g., apply rules for rounding)</td>
<td>g. Provide justifications for steps in a solution process</td>
<td>g. Generalize a pattern</td>
<td>g.</td>
</tr>
<tr>
<td>Level 1</td>
<td>Level 2</td>
<td>Level 3</td>
<td>Level 4</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------</td>
<td>------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Recall</td>
<td>Skills/Concepts</td>
<td>Strategic Thinking</td>
<td>Extended Thinking</td>
</tr>
<tr>
<td>k. Recall, identify, or make conversions between and among representations or numbers (fractions, decimals, and percents), or within and between customary and metric measures</td>
<td>i. Retrieve information from a table, graph, or figure and use it to solve a problem requiring multiple steps</td>
<td>k. Solve a multiple-step problem and provide support with a mathematical explanation that justifies the answer</td>
<td>g. Apply one approach among many to solve problems</td>
</tr>
<tr>
<td>l. Locate numbers on a number line, or points on a coordinate grid</td>
<td>j. Translate between tables, graphs, words and symbolic notation</td>
<td>l. Solve 2-step linear equations/inequalities in one variable over the rational numbers, interpret solution(s) in the original context, and verify reasonableness of results</td>
<td>h. Apply understanding in a novel way, providing an argument/justification for the application</td>
</tr>
<tr>
<td>m. Solve linear equations</td>
<td>k. Make direct translations between problem situations and symbolic notation</td>
<td>m. Translate between a problem situation and symbolic notation that is not a direct translation</td>
<td>i. Apply one approach among many to solve problems</td>
</tr>
<tr>
<td>n. Represent math relationships in words, pictures, or symbols</td>
<td>l. Select a procedure according to criteria and perform it</td>
<td>n. Formulate an original problem, given a situation</td>
<td>j. Apply understanding in a novel way, providing an argument/justification for the application</td>
</tr>
<tr>
<td>o. Read, write, and compare decimals in scientific notation</td>
<td>m. Specify and explain relationships between facts, terms, properties, or operations</td>
<td>o. Analyze the similarities and differences between procedures</td>
<td>k. Solve a multiple-step problem and provide support with a mathematical explanation that justifies the answer</td>
</tr>
<tr>
<td></td>
<td>n. Compare, classify, organize, estimate, or order data</td>
<td>p. Draw conclusion from observations or data, citing evidence</td>
<td>l. Solve 2-step linear equations/inequalities in one variable over the rational numbers, interpret solution(s) in the original context, and verify reasonableness of results</td>
</tr>
</tbody>
</table>

NOTE: Level 4 involves such things as complex restructuring of data or establishing and evaluating criteria to solve problems.
Question 9

Cooper leaves his house to go to school at 8:15 a.m. It takes 15 minutes to get to school. Cooper then plays on the playground for another 20 minutes before the bell rings.

Use the Add Arrow tool to draw the hour and minute hands to show the time when the bell rings.

Points Possible: 1

Content Cluster: Solve problems involving money, measurement and estimation of intervals of time, liquid volumes, and masses of objects.

Content Standard: Work with time and money. (3.MD.1)

Depth of Knowledge: Level 2
c. Use models to represent mathematical concepts
d. Solve a routine problem requiring multiple steps/decision points, or the application of multiple concepts
Scoring Guidelines

Exemplar Response

Other Correct Responses

- The hour hand can be after the 8 and before the 9.

For this item, a full-credit response includes:

- the correct time (1 point).
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Question 9

Sample Responses
Sample Response: 1 point

Cooper leaves his house to go to school at 8:15 a.m. It takes 15 minutes to get to school. Cooper then plays on the playground for another 20 minutes before the bell rings.

Use the Add Arrow tool to draw the hour and minute hands to show the time when the bell rings.

Notes on Scoring

This response earns full credit (1 point) because it identifies the correct time on the clock when the bell rings.

- The student may use the clock model to count 15 minutes from 8:15 a.m. and then count another 20 minutes more before placing the hands of the clock at 8:50 a.m.

20 minutes + 15 minutes = 35 minutes
8:15 a.m. + 35 minutes = 8:50 a.m.
Sample Response: 0 points

Cooper leaves his house to go to school at 8:15 a.m. It takes 15 minutes to get to school. Cooper then plays on the playground for another 20 minutes before the bell rings.

Use the Add Arrow tool to draw the hour and minute hands to show the time when the bell rings.

Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect time on the clock when the bell rings.

- The student may use the clock model to count 15 minutes from 8:15 a.m. and then count another 20 minutes more before placing the hands of the clock at 8:50 a.m. However, the student may think the hour hand on an analog clock is longer than the minute hand.
Sample Response: 0 points

Cooper leaves his house to go to school at 8:15 a.m. It takes 15 minutes to get to school. Cooper then plays on the playground for another 20 minutes before the bell rings.

Use the Add Arrow tool to draw the hour and minute hands to show the time when the bell rings.

Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect time on the clock when the bell rings.

The student may correctly identify the time as 8:50 a.m. but incorrectly place the hour hand on the 8 instead of recognizing that at 8:50 a.m. the time is closer to 9:00 a.m. than 8:00 a.m., so the hour hand will be closer to 9 than to 8.
Sample Response: 0 points

Cooper leaves his house to go to school at 8:15 a.m. It takes 15 minutes to get to school. Cooper then plays on the playground for another 20 minutes before the bell rings.

Use the Add Arrow tool to draw the hour and minute hands to show the time when the bell rings.
Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect time on the clock when the bell rings.

• The student may think school starts at 8:15 a.m. and count back 15 minutes and then 20 minutes from 8:15 a.m.

8:15 a.m. — 15 minutes = 8:00 a.m.
8:00 a.m. — 20 minutes = 7:40 a.m.
8:15 a.m. + 20 minutes + 15 minutes ≠ 7:40 a.m.
Question 10

Complete the sentence to create a true statement about the fraction $\frac{1}{3}$.

The fraction $\frac{1}{3}$ describes ______ when a whole is divided into ______.

Drop down choices:

The fraction $\frac{1}{3}$ describes ______ when a whole is divided into ______.

- 1 part
- 2 parts
- 3 parts

- 1 equal part.
- 2 equal parts.
- 3 equal parts.

Points Possible: 1

Content Cluster: Develop understanding of fractions as numbers. Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.

Content Standard: Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into $b$ equal parts; understand a fraction $a/b$ as the quantity formed by $a$ parts of size $1/b$. (3.NF.1)

Depth of Knowledge: Level 2
m. Specify and explain relationships between facts, terms, properties, or operations
Scoring Guidelines

Exemplar Response

- The fraction $\frac{1}{3}$ describes 1 part when a whole is divided into 3 equal parts.

Other Correct Responses

- N/A

For this item, a full-credit response includes:

- a correct statement (1 point).
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Question 10

Sample Responses
Sample Response: 1 point

Complete the sentence to create a true statement about the fraction $\frac{1}{3}$.

The fraction $\frac{1}{3}$ describes $\blacksquare$ part $\checkmark$ when a whole is divided into $\blacksquare$ equal parts. $\checkmark$

Notes on Scoring

This response earns full credit (1 point) because it identifies the sentence that creates a correct statement about $\frac{1}{3}$.

- The student may create an area model separated into three equal parts and recognize the sizes of the three equal parts of the whole each have a value of $\frac{1}{3}$.

\[ \frac{1}{3} \]
Sample Response: 0 points

Complete the sentence to create a true statement about the fraction $\frac{1}{3}$.

The fraction $\frac{1}{3}$ describes $\boxed{3 \text{ parts}}$ when a whole is divided into $\boxed{1 \text{ equal part}}$.

Notes on Scoring

This response earns no credit (0 points) because it identifies a sentence that creates an incorrect statement about $\frac{1}{3}$.

- The student may draw a number line labeled in three equal parts between 0 and 1 but misunderstand the representation of the part-whole relationship.

1 part + 1 part + 1 part = 3 parts

1 part 1 part 1 part

0 $\frac{1}{3}$ $\frac{2}{3}$ 1
Sample Response: 0 points

Complete the sentence to create a true statement about the fraction $\frac{1}{3}$.

The fraction $\frac{1}{3}$ describes $\underline{3 \text{ parts}}$ when a whole is divided into $\underline{3 \text{ equal parts}}$.

Notes on Scoring

This response earns no credit (0 points) because it identifies a sentence that creates an incorrect statement about $\frac{1}{3}$.

- The student may draw a number line labeled in three equal parts from 0 to 1 and identify the value of the whole figure rather than identifying the value of each equal part.

$1 \text{ part} + 1 \text{ part} + 1 \text{ part} = 3 \text{ parts}$

0 $\frac{1}{3}$ $\frac{2}{3}$ 1

1 part | 1 part | 1 part
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Question 11

Question and Scoring Guidelines
Question 11

Rachel, Liam, and Kiaan are stacking blocks. They want to see who can build the tallest tower of blocks without it falling over. They each record their number of blocks on the graph shown.

How many total blocks did Rachel, Liam, and Kiaan use to build their towers?

A 130  
B 160  
C 170  
D 180
Points Possible: 1

Content Cluster: Represent and interpret data.

Content Standard: Create scaled picture graphs to represent a data set with several categories. Create scaled bar graphs to represent a data set with several categories. Solve two-step “how many more” and “how many less” problems using information presented in the scaled graphs. For example, create a bar graph in which each square in the bar graph might represent 5 pets, then determine how many more/less in two given categories. (3.MD.3)

Depth of Knowledge: Level 2
i. Retrieve information from a table, graph, or figure and use it to solve a problem requiring multiple steps

Scoring Guidelines

Rationale for Option A: This is incorrect. The student may only add the 2 largest bars instead of all 3 bars.

Rationale for Option B: This is incorrect. The student may round the number of blocks Rachel and Kiaan use down to the nearest 10 before adding.

Rationale for Option C: Key – The student correctly identifies that they should add the height of the 3 bars together. They identify the heights as 55 blocks, 40 blocks, and 75 blocks, and correctly add these 3 numbers together.

Rationale for Option D: This is incorrect. The student may round the number of blocks Rachel and Kiaan use up to the nearest 10 before adding.
Sample Response: 1 point

Rachel, Liam, and Kiaan are stacking blocks. They want to see who can build the tallest tower of blocks without it falling over. They each record their number of blocks on the graph shown.

![Bar graph showing the number of blocks for Rachel, Liam, and Kiaan.]

How many total blocks did Rachel, Liam, and Kiaan use to build their towers?

A 130
B 160
C 170
D 180
Grade 3 Math
Spring 2019 Item Release

Question 12

Question and Scoring Guidelines
### Question 12

An equation is given.

72 ÷ 9 = □

Enter a related multiplication equation that shows the missing value.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>+</th>
<th>-</th>
<th>×</th>
<th>÷</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td>&lt;</td>
<td>=</td>
<td>&gt;</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
<td>(</td>
<td></td>
<td></td>
<td>)</td>
</tr>
</tbody>
</table>

**Points Possible:** 1

**Content Cluster:** Understand properties of multiplication and the relationship between multiplication and division.

**Content Standard:** Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8. (3.OA.6)

**Depth of Knowledge:** Level 2
1. Select a procedure according to criteria and perform it
Scoring Guidelines

Exemplar Response

• $8 \times 9 = 72$

Other Correct Responses

• $9 \times 8 = 72$

For this item, a full-credit response includes:

• a correct equation (1 point).
Sample Response: 1 point

An equation is given.

\[ 72 \div 9 = \Box \]

Enter a related multiplication equation that shows the missing value.

\[ 8 \times 9 = 72 \]
Notes on Scoring

This response earns full credit (1 point) because it identifies a correct multiplication equation that shows the missing value for $72 \div 9 = \square$.

- The student may use an array to identify the missing value in the equation $72 \div 9 = \square$ and use the numbers from the array to create a multiplication equation.

![Array Diagram]

- $72 \div 9 = \square$
- $\square = 8$
- $72 \div 9 = 8$
- $8 \times 9 = 72$
Sample Response: 1 point

An equation is given.

72 ÷ 9 = □

Enter a related multiplication equation that shows the missing value.

72 = 9 × 8
Notes on Scoring

This response earns full credit (1 point) because it identifies a correct multiplication equation that shows the missing value for $72 \div 9 = \Box$.

- The student may use an array to identify the missing value in the equation $72 \div 9 = \Box$ and use the numbers from the array to create a multiplication equation.

### 72 divided into 9 equal groups

1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 =

9 groups

$72 \div 9 = \Box$

$\Box = 8$

$72 \div 9 = 8$

9 groups of 8 dots = 72 dots

$72 = 9 \times 8$
An equation is given.

72 ÷ 9 = □

Enter a related multiplication equation that shows the missing value.

9×72=648
Notes on Scoring

This response earns no credit (0 points) because it identifies an incorrect multiplication equation to show the missing value for $72 \div 9 = \square$.

- The student may misidentify the relationship between multiplication and division in the problem and think they are supposed to write a multiplication equation for $9 \times 72$.

\[
\begin{array}{c}
\times \\
9 \\
\hline
70 \quad 2 \\
\hline
\end{array}
\]

\[
\begin{array}{c}
\times \\
9 \\
\hline
70 \\
18 \\
\hline
630 \\
\end{array}
\]

\[
9 \times 70 + 9 \times 2 = 630 + 18 = 648 \\
72 \div 9 \neq 648
\]
Sample Response: 0 points

An equation is given.

\[ 72 \div 9 = \square \]

Enter a related multiplication equation that shows the missing value.

\[ 9 \times 8 \]

Notes on Scoring

This response earns no credit (0 points) because it identifies an incorrect multiplication equation to show the missing value for \( 72 \div 9 = \square \).

- The student writes an incomplete equation.
Grade 3 Math
Spring 2019 Item Release

Question 15

Question and Scoring Guidelines
Question 15

Andre wants to plant 72 flowers in a garden.

- The garden should have at least 3 rows of flowers.
- Each row should have the same number of flowers.
- Each row should have at least 3 flowers.

Enter numbers into the table to show two different ways that Andre can plant the flowers.

<table>
<thead>
<tr>
<th>Number of Rows</th>
<th>Number of Flowers in Each Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Way</td>
<td></td>
</tr>
<tr>
<td>Second Way</td>
<td></td>
</tr>
</tbody>
</table>

Points Possible: 1

Content Cluster: Represent and solve problems involving multiplication and division.

Content Standard: Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. (Note: These standards are written with the convention that \(a \times b\) means \(a\) groups of \(b\) objects each; however, because of the commutative property, students may also interpret \(5 \times 7\) as the total number of objects in 7 groups of 5 objects each). (3.OA.1)

Depth of Knowledge: Level 3
f. Perform procedure with multiple steps and multiple decision points
Scoring Guidelines

Exemplar Response

<table>
<thead>
<tr>
<th></th>
<th>Number of Rows</th>
<th>Number of Flowers in Each Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Way</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Second Way</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

Other Correct Responses

- any table where
  - the entries in the table are whole number values
  - the product of the entries in a row is 72
  - the two rows are different
  - the value in each column is greater than or equal to 3

For this item, a full-credit response includes:

- a correct table (1 point).
Sample Response: 1 point

Andre wants to plant 72 flowers in a garden.

- The garden should have at least 3 rows of flowers.
- Each row should have the same number of flowers.
- Each row should have at least 3 flowers.

Enter numbers into the table to show two different ways that Andre can plant the flowers.

<table>
<thead>
<tr>
<th></th>
<th>Number of Rows</th>
<th>Number of Flowers in Each Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Way</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Second Way</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

Notes on Scoring

This response earns full credit (1 point) because it identifies two correct ways Andre can plant his flowers.

- The student may use an array to identify two ways Andre can plant his flowers.

First Way

Second Way

9 rows of 8 flowers in each row

8 rows of 9 flowers in each row

9 × 8 = 72

8 × 9 = 72
Sample Response: 1 point

Andre wants to plant 72 flowers in a garden.

- The garden should have at least 3 rows of flowers.
- Each row should have the same number of flowers.
- Each row should have at least 3 flowers.

Enter numbers into the table to show two different ways that Andre can plant the flowers.

<table>
<thead>
<tr>
<th></th>
<th>Number of Rows</th>
<th>Number of Flowers in Each Row</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Way</strong></td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td><strong>Second Way</strong></td>
<td>12</td>
<td>6</td>
</tr>
</tbody>
</table>
Notes on Scoring

This response earns full credit (1 point) because it identifies two correct ways Andre can plant his flowers.

- The student may use an array to identify two ways Andre can plant his flowers.

<table>
<thead>
<tr>
<th>First Way</th>
<th>Second Way</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Array 1" /></td>
<td><img src="image2.png" alt="Array 2" /></td>
</tr>
<tr>
<td>9 rows of 8 flowers in each row</td>
<td>12 rows of 6 flowers in each row</td>
</tr>
<tr>
<td>$9 \times 8 = 72$</td>
<td>$12 \times 6 = 72$</td>
</tr>
</tbody>
</table>
Sample Response: 0 points

Andre wants to plant 72 flowers in a garden.

- The garden should have at least 3 rows of flowers.
- Each row should have the same number of flowers.
- Each row should have at least 3 flowers.

Enter numbers into the table to show two different ways that Andre can plant the flowers.

<table>
<thead>
<tr>
<th>Number of Rows</th>
<th>Number of Flowers in Each Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Way</td>
<td>1</td>
</tr>
<tr>
<td>Second Way</td>
<td>3</td>
</tr>
</tbody>
</table>

Notes on Scoring

This response earns no credit (0 points) because it identifies one correct and one incorrect way Andre can plant his flowers.

- The student may use a model to identify two ways Andre can plant his flowers with only one of the ways containing at least three rows.

<table>
<thead>
<tr>
<th>First Way</th>
<th>Second Way</th>
</tr>
</thead>
<tbody>
<tr>
<td>72 flowers</td>
<td>24 flowers</td>
</tr>
<tr>
<td>24 flowers</td>
<td>24 flowers</td>
</tr>
<tr>
<td>24 flowers</td>
<td>24 flowers</td>
</tr>
</tbody>
</table>

1 row of 72 flowers in each row

$1 \times 72 = 72$

3 rows of 24 flowers in each row

$3 \times 24 = 72$
Sample Response: 0 points

Andre wants to plant 72 flowers in a garden.

- The garden should have at least 3 rows of flowers.
- Each row should have the same number of flowers.
- Each row should have at least 3 flowers.

Enter numbers into the table to show two different ways that Andre can plant the flowers.

<table>
<thead>
<tr>
<th></th>
<th>Number of Rows</th>
<th>Number of Flowers in Each Row</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Way</strong></td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td><strong>Second Way</strong></td>
<td>6</td>
<td>12</td>
</tr>
</tbody>
</table>
Notes on Scoring

This response earns no credit (0 points) because it identifies two identical ways Andre can plant his flowers.

- The student may use an array to identify two identical ways Andre can plant his flowers rather than identifying two different ways Andre can plant his flowers.

First Way

6 rows of 12 flowers in each row

\[ 6 \times 12 = 72 \]

Second Way

6 rows of 12 flowers in each row

\[ 6 \times 12 = 72 \]
Sample Response: 0 points

Andre wants to plant 72 flowers in a garden.

- The garden should have at least 3 rows of flowers.
- Each row should have the same number of flowers.
- Each row should have at least 3 flowers.

Enter numbers into the table to show two different ways that Andre can plant the flowers.

<table>
<thead>
<tr>
<th></th>
<th>Number of Rows</th>
<th>Number of Flowers in Each Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Way</td>
<td>64</td>
<td>8</td>
</tr>
<tr>
<td>Second Way</td>
<td>32</td>
<td>40</td>
</tr>
</tbody>
</table>

Notes on Scoring

This response earns no credit (0 points) because it identifies two incorrect ways Andre can plant his flowers.

- The student may think the sum of the number of flowers in each row and the number of rows should be 72.

  $64 + 8 = 72$ AND $32 + 40 = 72$

  $64 \times 8 \neq 72$ AND $32 \times 40 \neq 72$
Grade 3 Math
Spring 2019 Item Release

Question 22

Question and Scoring Guidelines
Question 22

Which area model represents the expression \((3 \times 6) + (3 \times 5)\)?

A

B

C

D

Points Possible: 1

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

Content Standard: Relate area to the operations of multiplication and addition. \((3.MD.7)\)
c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths \(a\) and \(b + c\) is the sum of \(a \times b\) and \(a \times c\) (represent the distributive property with visual models including an area model).

Depth of Knowledge: Level 2
c. Use models to represent mathematical concepts
Scoring Guidelines

Rationale for Option A: This is incorrect. The student chooses an area model that represents the expression $6 \times (3 + 5) \text{ or } (6 \times 3) + (6 \times 5)$.

Rationale for Option B: This is incorrect. The student chooses an area model that represents the expression $6 \times (3 + 6) \text{ or } (6 \times 3) + (6 \times 6)$.

Rationale for Option C: Key – The student correctly identifies the area model that represents the expression $3 \times (6 + 5) \text{ or } (3 \times 6) + (3 \times 5)$.

Rationale for Option D: This is incorrect. The student chooses an area model that represents the expression $6 \times (6 + 5) \text{ or } (6 \times 6) + (6 \times 5)$.

Sample Response: 1 point
A pattern is given.

22, 19, 16, __, 10, 7

What is the missing number in the pattern? Enter the number in the box.

Points Possible: 1

**Content Cluster:** Solve problems involving the four operations, and identify and explain patterns in arithmetic.

**Content Standard:** Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends. (3.OA.9)

**Depth of Knowledge:** Level 2

h. Extend a pattern
Scoring Guidelines

Exemplar Response

- 13

Other Correct Responses

- any equivalent value

For this item, a full-credit response includes:

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

A pattern is given.

22, 19, 16, ___, 10, 7

What is the missing number in the pattern? Enter the number in the box.

13

Notes on Scoring

This response earns full credit (1 point) because it identifies the correct missing number in the pattern.

- The student may draw a number line from 7 to 22 to help count down to 13 by threes starting at 22 and then check their work by counting up to 13 by threes from 7.
Sample Response: 0 points

A pattern is given.

22, 19, 16, ____, 10, 7

What is the missing number in the pattern? Enter the number in the box.

14

Notes on Scoring

This response earns no credit (0 points) because it identifies an incorrect missing number in the pattern.

- The student may create a drawing to represent the numbers in the pattern and incorrectly subtract 3 from 16 to get a missing number of 14.
Sample Response: 0 points

A pattern is given.

22, 19, 16, ___, 10, 7

What is the missing number in the pattern? Enter the number in the box.

3

Notes on Scoring

This response earns no credit (0 points) because it identifies an incorrect missing number in the pattern.

- The student may draw a number line from 7 to 22 to help identify the difference between the numbers without identifying the missing number in the pattern.
Grade 3 Math
Spring 2019 Item Release

Question 25

Question and Scoring Guidelines
Question 25

Enter a number to complete the equation.

166 + □□ = 378

Points Possible: 1

Content Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic. A range of strategies and algorithms may be used.

Content Standard: Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. (3.NBT.2)

Depth of Knowledge: Level 2
d. Solve a routine problem requiring multiple steps/decision points, or the application of multiple concepts

Scoring Guidelines

Exemplar Response

- 212

Other Correct Responses

- any equivalent value

For this item, a full-credit response includes:

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

Enter a number to complete the equation.

\[
166 + \quad \square \quad = \quad 378
\]

Notes on Scoring

This response earns full credit (1 point) because it identifies the correct missing number in the equation.

- The student may count on from 166 up to 378 using a number line to find the missing number in the equation.

\[
100 + 100 + 10 + 2 = \square \\
378 - 166 = 212 \\
166 + \square = 378 \\
\square = 212
\]
Sample Response: 0 points

Enter a number to complete the equation.

\[ 166 + \boxed{112} = 378 \]

Notes on Scoring

This response earns no credit (0 points) because it identifies an incorrect missing number in the equation.

- The student may make a subtraction error.

\[
\begin{array}{c}
23 \ 7 \ 8 \\
- \ 1 \ 6 \ 6 \\
\hline
1 \ 1 \ 2 \\
\end{array}
\]

\[ 378 - 166 \neq 112 \]
Sample Response: 0 points

Notes on Scoring

This response earns no credit (0 points) because it identifies an incorrect missing number in the equation.

- The student may use a number line to add 378 to 166 instead of subtracting 166 from 378.
Grade 3 Math
Spring 2019 Item Release

Question 27

Question and Scoring Guidelines
Question 27

Select the three shapes that each have an area of 16 square feet.
Scoring Guidelines

**Rationale for First Option:** Key – The student correctly counts that there are 16 unit squares in this rectangle, so the area is 16 square feet.

**Rationale for Second Option:** This is incorrect. The student may count squares to get a length of 10 and a width of 6 and then add these numbers to obtain the area of the rectangle instead of multiplying to get the correct area.

**Rationale for Third Option:** This is incorrect. The student may confuse area with perimeter and identify a rectangle with a perimeter of 16 feet.

**Rationale for Fourth Option:** Key – The student correctly counts that there are 16 unit squares in this shape, so the area is 16 square feet.

**Rationale for Fifth Option:** Key – The student correctly counts that there are 16 unit squares in this rectangle, so the area is 16 square feet.
Sample Response: 1 point

Select the **three** shapes that each have an area of 16 square feet.

- [ ]
  - 1 ft
  - 1 ft

- [ ]
  - 1 ft
  - 1 ft

- [ ]
  - 1 ft
  - 1 ft

- [ ]
  - 1 ft
  - 1 ft

- [ ]
  - 1 ft
  - 1 ft
Grade 3 Math
Spring 2019 Item Release

Question 28

Question and Scoring Guidelines
Question 28

This item has three parts.

Part A. Create models for two different fractions that are greater than 1.

Key

= 1

Fraction 1

Fraction 2

Part B. Select the words that correctly complete each sentence.

• Fraction 1 has _____ parts of the wholes shaded than Fraction 2.

• The parts in Fraction 1 are _____ the parts in Fraction 2.

• Fraction 1 is _____ Fraction 2.

Part C. Which statement correctly compares the two fractions?

• Fraction 1 > Fraction 2
• Fraction 1 = Fraction 2
• Fraction 1 < Fraction 2
Points Possible: 2

Content Cluster: Develop understanding of fractions as numbers. Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.

Content Standard: Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. (3.NF.3)

d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

Depth of Knowledge: Level 3
d. Use evidence to develop logical arguments for a concept

k. Solve a multiple-step problem and provide support with a mathematical explanation that justifies the answer
Scoring Guidelines

Score: 2

For 2 points, the response satisfies both of the bullets below.

- The student correctly completes the statements or selects a correct comparison based on a previous part, providing evidence of the ability to compare fractions with the same denominator using visual models or reasoning about their sizes.
- The student correctly creates the fraction models, completes the statements, and selects a correct comparison, providing evidence of the ability to compare fractions with the same denominator using visual models or reasoning about their sizes.

Exemplar Response:

- Part A

- Part B
  - Fraction 1 has more parts of the wholes shaded than Fraction 2.
  - The parts in Fraction 1 are the same size as the parts in Fraction 2.
  - Fraction 1 is greater than Fraction 2.

- Part C
  - Fraction 1 > Fraction 2
Score: 1

- For 1 point, the response satisfies one of the bullets.

Exemplar Response:

- Part A

  Fraction 1
  
  Fraction 2

- Part B
  - Fraction 1 has **more** parts of the wholes shaded than Fraction 2.
  - The parts in Fraction 1 are **the same size as** the parts in Fraction 2.
  - Fraction 1 is **greater than** Fraction 2.

- Part C
  - Fraction 1 = Fraction 2

*Note: The student can get partial credit for matching two of the interactions even if the fractions modeled in Part A are not greater than 1.*
Grade 3 Math
Spring 2019 Item Release

Question 28

Sample Responses
Sample Response: 2 points

This item has three parts.

**Part A.** Create models for two different fractions that are greater than 1.

<table>
<thead>
<tr>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>[]</td>
</tr>
<tr>
<td>= 1</td>
</tr>
</tbody>
</table>

**Fraction 1**

[Diagram showing fraction models]

**Fraction 2**

[Diagram showing fraction models]

**Part B.** Select the words that correctly complete each sentence.

- Fraction 1 has **more** parts of the wholes shaded than Fraction 2.
- The parts in Fraction 1 are **the same size as** the parts in Fraction 2.
- Fraction 1 is **greater than** Fraction 2.

**Part C.** Which statement correctly compares the two fractions?

- ( ) Fraction 1 > Fraction 2
- ( ) Fraction 1 = Fraction 2
- ( ) Fraction 1 < Fraction 2
Notes on Scoring

This response earns full credit (2 points) because PART A correctly identifies models for two different fractions greater than 1, PART B correctly completes the statements based on the models from PART A, and PART C identifies the correct comparison based on the models from PART A.
Sample Response: 2 points

This item has three parts.

Part A. Create models for two different fractions that are greater than 1.

<table>
<thead>
<tr>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>= 1</td>
</tr>
</tbody>
</table>

Fraction 1

```
[Diagram of fraction 1 with 5 shaded parts and 1 unshaded part]
```

Fraction 2

```
[Diagram of fraction 2 with 5 shaded parts]
```

Part B. Select the words that correctly complete each sentence.

- Fraction 1 has fewer parts of the wholes shaded than Fraction 2.
- The parts in Fraction 1 are the same size as the parts in Fraction 2.
- Fraction 1 is less than Fraction 2.

Part C. Which statement correctly compares the two fractions?

- Fraction 1 > Fraction 2
- Fraction 1 = Fraction 2
- Fraction 1 < Fraction 2
Notes on Scoring

This response earns full credit (2 points) because PART A correctly identifies models for two different fractions greater than 1. PART B correctly completes the statements based on the models from PART A, and PART C identifies the correct comparison based on the models from PART A.
Sample Response: 1 point

This item has three parts.

**Part A.** Create models for two different fractions that are greater than 1.

Key

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>= 1</th>
</tr>
</thead>
</table>

**Fraction 1**

**Fraction 2**

**Part B.** Select the words that correctly complete each sentence.

- Fraction 1 has fewer parts of the wholes shaded than Fraction 2.
- The parts in Fraction 1 are smaller than the parts in Fraction 2.
- Fraction 1 is less than Fraction 2.

**Part C.** Which statement correctly compares the two fractions?

- Fraction 1 > Fraction 2
- Fraction 1 = Fraction 2
- Fraction 1 < Fraction 2
Notes on Scoring

This response earns partial credit (1 point) because PART A correctly identifies models for two different fractions greater than 1, and PART C identifies the correct comparison based on the models from PART A. PART B incorrectly completes the statements based on the models from PART A.

• The student may think the middle sentence is referring to the number of shaded parts instead of the size of the parts in Fraction 1 and Fraction 2.
This item has three parts.

Part A. Create models for two different fractions that are greater than 1.

- Fraction 1
- Fraction 2

Part B. Select the words that correctly complete each sentence.
- Fraction 1 has **more** parts of the wholes shaded than Fraction 2.
- The parts in Fraction 1 are **the same size as** the parts in Fraction 2.
- Fraction 1 is **greater than** Fraction 2.

Part C. Which statement correctly compares the two fractions?
- Fraction 1 > Fraction 2
- Fraction 1 = Fraction 2
- Fraction 1 < Fraction 2
Notes on Scoring

This response earns partial credit (1 point) because PART C identifies the correct comparison based on the statement in PART B. PART A incorrectly identifies models for two different fractions greater than 1.

- The student may think only one of the two different fraction models needs to be greater than 1.
- In PART B, the student may compare the white parts in Fraction 1 and Fraction 2 instead of comparing the blue parts of both fractions.
Sample Response: 1 point

This item has three parts.

Part A. Create models for two different fractions that are greater than 1.

Key

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Part B. Select the words that correctly complete each sentence.

• Fraction 1 has fewer parts of the wholes shaded than Fraction 2.
• The parts in Fraction 1 are the same size as the parts in Fraction 2.
• Fraction 1 is less than Fraction 2.

Part C. Which statement correctly compares the two fractions?

A. Fraction 1 > Fraction 2
B. Fraction 1 = Fraction 2
C. Fraction 1 < Fraction 2
Notes on Scoring

This response earns partial credit (1 point) because PART C identifies the correct comparison based on the models in PART A.

- In PART A, the student may think the two models can add up to being greater than 1 instead of each model having a value greater than 1.
- In PART B, the student may think Fraction 1 is the 1 whole represented by the Key and Fraction 2 is the total of \( \frac{4}{3} \) they created in PART A when identifying Fraction 1 as less than Fraction 2.

Note: The student can earn credit by matching two parts of the three parts even if the fractions in PART A are not both greater than 1.
Sample Response: 0 points

This item has three parts.

Part A. Create models for two different fractions that are greater than 1.

<table>
<thead>
<tr>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>= 1</td>
</tr>
</tbody>
</table>

- Fraction 1
- Fraction 2

Part B. Select the words that correctly complete each sentence.

- Fraction 1 has **more** parts of the wholes shaded than Fraction 2.
- The parts in Fraction 1 are **larger than** the parts in Fraction 2.
- Fraction 1 is **greater than** Fraction 2.

Part C. Which statement correctly compares the two fractions?

- 1. Fraction 1 > Fraction 2
- 2. Fraction 1 = Fraction 2
- 3. Fraction 1 < Fraction 2
Notes on Scoring

This response earns no credit (0 points) because neither the statement in Part B or the comparison in PART C match the model created in Part A or each other.

- In PART B and PART C, the student may compare the white parts of the whole in Fraction 1 to the white parts of the whole in Fraction 2 instead of the blue parts of the whole in both Fraction 1 and 2.
- In PART B, the student may identify the total amount of white parts in Fraction 1 as being “larger than” the total amount of white parts in Fraction 2 instead of the total amount of blue shaded parts in both Fraction 1 and 2.
Sample Response: 0 points

This item has three parts.

Part A. Create models for two different fractions that are greater than 1.

<table>
<thead>
<tr>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>🟢🟢 = 1</td>
</tr>
</tbody>
</table>

**Fraction 1**

| 🟢🟢 | 🟢🟢 | | | |

**Fraction 2**

| | 🟢🟢 | 🟢🟢 | |

Part B. Select the words that correctly complete each sentence.

- Fraction 1 has **more** parts of the wholes shaded than Fraction 2.
- The parts in Fraction 1 are **larger** than the parts in Fraction 2.
- Fraction 1 is **greater** than Fraction 2.

Part C. Which statement correctly compares the two fractions?

- A. Fraction 1 > Fraction 2
- B. Fraction 1 = Fraction 2
- C. Fraction 1 < Fraction 2
Notes on Scoring

This response earns no credit (0 points) because neither the statement in PART B or the comparison in PART C match the model created in PART A or each other.

- In PART B, the student may identify the number of parts shaded blue in Fraction 1 as “larger than” the number of parts shaded blue in Fraction 2 instead of recognizing the size of the parts of the whole in both Fraction 1 and 2 are the same.
- In PART C, the student may think “<” is the symbol for greater than.
Question 29

Jennifer has 4 packages of pens. Each package contains 20 pens. How many pens does Jennifer have in all? Enter the number in the box.

Points Possible: 1

Content Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic. A range of strategies and algorithms may be used.

Content Standard: Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations. (3.NBT.3)

Depth of Knowledge: Level 2
d. Solve a routine problem requiring multiple steps/decision points, or the application of multiple concepts
Scoring Guidelines

Exemplar Response

- 80

Other Correct Responses

- any equivalent value

For this item, a full-credit response includes:

- the correct value (1 point).
Grade 3 Math
Spring 2019 Item Release

Question 29

Sample Responses
Sample Response: 1 point

Jennifer has 4 packages of pens. Each package contains 20 pens.
How many pens does Jennifer have in all? Enter the number in the box.

80

Notes on Scoring

This response earns full credit (1 point) because it identifies the correct number of pens Jennifer has in all.

- The student may use a number line to show 4 packages with 20 pens in each package and add the four groups of 20 pens to identify the number of pens Jennifer has in all.

20 + 20 + 20 + 20 = 4 × 20 = 80
Sample Response: 0 points

Jennifer has 4 packages of pens. Each package contains 20 pens.

How many pens does Jennifer have in all? Enter the number in the box.

5

Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect number of pens Jennifer has in all.

- The student may divide 20 pens equally into 4 packages instead of multiplying 4 packages by 20 pens.

20 ÷ 4 = 5
4 × 20 ≠ 5
Sample Response: 0 points

Jennifer has 4 packages of pens. Each package contains 20 pens.
How many pens does Jennifer have in all? Enter the number in the box.

24

Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect number of pens Jennifer has in all.

- The student may add 4 packages of pens to 20 pens.
  
  \[4 + 20 = 24\]
  
  \[4 \times 20 \neq 24\]
Grade 3 Math
Spring 2019 Item Release

Question 30

Question and Scoring Guidelines
Question 30

At lunch, there are 48 third-graders. Every table in the lunchroom has the same number of chairs. Every student has a seat and every table is full.

How many tables are needed? Enter the number in the first box.

How many chairs are there at each table? Enter the number in the second box.

• There may be more than one correct answer.

Number of tables: [ ]

Number of chairs at each table: [ ]

Points Possible: 1

Content Cluster: Represent and solve problems involving multiplication and division.

Content Standard: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. See Table 2, page 96. Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.) (3.OA.3)

Depth of Knowledge: Level 3

n. Formulate an original problem, given a situation
Scoring Guidelines

Exemplar Response

- Number of tables: 6
  Number of chairs at each table: 8

Other Correct Responses

- Any response where the product of the two positive integers equals 48 is accepted.

For this item, a full-credit response includes:

- a correct pair of values (1 point).
Grade 3 Math
Spring 2019 Item Release
Question 30
Sample Responses
Sample Response: 1 point

At lunch, there are 48 third-graders. Every table in the lunchroom has the same number of chairs. Every student has a seat and every table is full.

How many tables are needed? Enter the number in the first box.

How many chairs are there at each table? Enter the number in the second box.

• There may be more than one correct answer.

**Number of tables:** 6

**Number of chairs at each table:** 8

Notes on Scoring

This response earns full credit (1 point) because it identifies a correct number of tables and chairs at each table.

• The student may draw a picture to model the situation and divide the 48 third graders across 6 tables with an equal number of 8 chairs at each table.
Sample Response: 1 point

At lunch, there are 48 third-graders. Every table in the lunchroom has the same number of chairs. Every student has a seat and every table is full.

How many tables are needed? Enter the number in the first box.

How many chairs are there at each table? Enter the number in the second box.

- There may be more than one correct answer.

Number of tables: 4

Number of chairs at each table: 12

<table>
<thead>
<tr>
<th>Number of Tables</th>
<th>Number of Chairs at Each Table</th>
<th>Mathematical Thinking</th>
<th>Total Number of Chairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12</td>
<td>12 = 1 x 12 = 12</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>12 + 12 = 2 x 12 = 24</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>12 + 12 + 12 = 3 x 12 = 36</td>
<td>36</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>12 + 12 + 12 + 12 = 4 x 12 = 48</td>
<td>48</td>
</tr>
</tbody>
</table>

Notes on Scoring

This response earns full credit (1 point) because it identifies a correct number of tables and chairs at each table.

- The student may create a table to develop their mathematical thinking and use repeated addition to combine four equal-sized groups of 12 chairs.
Sample Response: 0 points

At lunch, there are 48 third-graders. Every table in the lunchroom has the same number of chairs. Every student has a seat and every table is full.

How many tables are needed? Enter the number in the first box.

How many chairs are there at each table? Enter the number in the second box.

• There may be more than one correct answer.

Number of tables: 40

Number of chairs at each table: 8

Notes on Scoring

This response earns no credit (0 points) because it identifies an incorrect number of tables and chairs at each table.

• The student may think they are supposed to identify two numbers with a sum of 48 instead of recognizing the 48 third graders need to be divided into equal groups of students at each table.

40 + 8 = 48

48 ÷ 40 ≠ 8
Sample Response: 0 points

At lunch, there are 48 third-graders. Every table in the lunchroom has the same number of chairs. Every student has a seat and every table is full.

How many tables are needed? Enter the number in the first box.
How many chairs are there at each table? Enter the number in the second box.

• There may be more than one correct answer.

Number of tables: 88
Number of chairs at each table: 40

Notes on Scoring

This response earns no credit (0 points) because it identifies an incorrect number of tables and chairs at each table.

• The student may think they are supposed to identify two numbers with a difference of 48 instead of recognizing the 48 third graders need to be divided into equal groups of students at each table.

88 − 40 = 48
48 ÷ 88 ≠ 40
Grade 3 Math
Spring 2019 Item Release

Question 31

Question and Scoring Guidelines
Question 31

Which stick has a length of \( \frac{1}{2} \) inch?

A

\[
\begin{array}{c|c|c}
\text{inches} & 1 & 2 \\
\hline
\end{array}
\]

B

\[
\begin{array}{c|c|c}
\text{inches} & 1 & 2 \\
\hline
\end{array}
\]

C

\[
\begin{array}{c|c|c}
\text{inches} & 1 & 2 \\
\hline
\end{array}
\]

D

\[
\begin{array}{c|c|c}
\text{inches} & 1 & 2 \\
\hline
\end{array}
\]

Points Possible: 1

Content Cluster: Represent and interpret data.

Content Standard: Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by creating a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3.MD.4)

Depth of Knowledge: Level 1
f. Measure
Scoring Guidelines

Rationale for Option A: **Key** – The student notes that, even though the stick is 1/4 the length of the ruler, 1/4 of a 2-inch segment is 1/2 inch.

Rationale for Option B: This is incorrect. The student may select a stick that is as long as half the total ruler, rather than 1/2 inch.

Rationale for Option C: This is incorrect. The student may select the stick that is 1 tick mark long, ignoring that the ruler is divided into fourths and not halves.

Rationale for Option D: This is incorrect. The student may select the stick that is 3 tick marks long because he or she misreads the measurements on the ruler.

**Sample Response: 1 point**
Grade 3 Math
Spring 2019 Item Release

Question 33

Question and Scoring Guidelines
Question 33

A girl walks around the perimeter of a park, as shown.

What is the perimeter, in meters (m), of the park? Enter the number in the box.

$meters$

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>0</td>
<td>.</td>
<td>8</td>
</tr>
</tbody>
</table>
**Points Possible:** 1

**Content Cluster:** Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

**Content Standard:** Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters. *(3.MD.8)*

**Depth of Knowledge:** Level 1
d. Determine the area or perimeter of rectangles or triangles given a drawing and labels

---

**Scoring Guidelines**

**Exemplar Response**

- 984

**Other Correct Responses**

- any equivalent value

For this item, a full-credit response includes:

- a correct value (1 point).
Grade 3 Math
Spring 2019 Item Release

Question 33

Sample Responses
Sample Response: 1 point

A girl walks around the perimeter of a park, as shown.

What is the perimeter, in meters (m), of the park? Enter the number in the box.

984 meters
Notes on Scoring

This response earns full credit (1 point) because it identifies the correct perimeter, in meters, of the park.

- The student may apply the Associative Property of Addition to rearrange the lengths of the sides of the park before adding the distances together.

\[
120 + 324 + 120 + 210 + 210 \\
= (120 + 120) + (210 + 210) + 324 \\
= (240 + 420) + 324 \\
= 660 + 324 \\
= 984 \text{ meters}
\]
Sample Response: 0 points

A girl walks around the perimeter of a park, as shown.

What is the perimeter, in meters (m), of the park? Enter the number in the box.

660 meters
Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect perimeter, in meters, of the park.

- The student may add only the distances on four of the five sides together using a number line.

\[ 210 + 210 + 120 + 120 = 660 \]

\[ 210 + 210 + 120 + 120 + 324 \neq 660 \]
A girl walks around the perimeter of a park, as shown.

What is the perimeter, in meters (m), of the park? Enter the number in the box.

Sample Response: 0 points

32 meters
Notes on Scoring

This response earns no credit (0 points) because it identifies the incorrect perimeter, in meters, of the park.

- The student may count the sidewalk tiles around the perimeter of the park.

\[ 210 + 210 + 120 + 120 + 324 \neq 32 \]
Grade 3 Math
Spring 2019 Item Release

Question 36

Question and Scoring Guidelines
Question 36

What is 761 rounded to the nearest hundred? Enter the number in the box.

- Points Possible: 1
- Content Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic. A range of strategies and algorithms may be used.
- Content Standard: Use place value understanding to round whole numbers to the nearest 10 or 100. (3.NBT.1)
- Depth of Knowledge: Level 1
  g. Perform a specified or routine procedure (e.g. apply rules for rounding
Scoring Guidelines

Exemplar Response

• 800

Other Correct Responses

• any equivalent value

For this item, a full-credit response includes:

• the correct value (1 point).
Grade 3 Math
Spring 2019 Item Release

Question 36

Sample Responses
Sample Response: 1 point

What is 761 rounded to the nearest hundred? Enter the number in the box.

800

Notes on Scoring

This response earns full credit (1 point) because it identifies the correct number that 761 rounds to when rounded to the nearest hundred.

- The student may create a number line from 700 to 800 and recognize that 761 rounds to 800 when rounding to the nearest hundred because 761 is closer to 800 than 700.
Sample Response: 0 points

What is 761 rounded to the nearest hundred? Enter the number in the box.

700

Notes on Scoring

This response earns no credit (0 points) because it identifies an incorrect number that 761 rounds to when rounded to the nearest hundred.

- The student may create a number line from 700 to 800 and round 761 down to 700 because the distance from 700 to 761 is longer than the distance from 761 to 800, not recognizing that when rounding to the nearest hundred the given number rounds to the hundred it is closest to.
Sample Response: 0 points

What is 761 rounded to the nearest hundred? Enter the number in the box.

760

Notes on Scoring

This response earns no credit (0 points) because it identifies an incorrect number that 761 rounds to when rounded to the nearest hundred.

- The student may mistakenly create a number line from 760 to 770 and round 761 down to the nearest ten of 760 instead of rounding 761 to the nearest hundred.
Grade 3 Math
Spring 2019 Item Release

Question 42

Question and Scoring Guidelines
Question 42

Which number line shows point V located at $\frac{1}{6}$?

A

B

C

D

Points Possible: 1

Content Cluster: Develop understanding of fractions as numbers. Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.

Content Standard: Understand a fraction as a number on the number line; represent fractions on a number line diagram. (3.NF.2)

a. Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size $1/b$ and that the endpoint of the part based at 0 locates the number $1/b$ on the number line.

Depth of Knowledge: Level 2
c. Use models to represent mathematical concepts
Scoring Guidelines

Rationale for Option A: This is incorrect. The student may select a number line which partitions the interval from 0 to 1 into 5 equal parts instead of 6 equal parts.

Rationale for Option B: Key – The student correctly selects a number line which partitions the interval from 0 to 1 into 6 equal parts.

Rationale for Option C: This is incorrect. The student may select a number line which partitions the interval from 0 to 1 into 7 equal parts instead of 6 equal parts.

Rationale for Option D: This is incorrect. The student may select a number line which partitions the interval from 0 to 1 into 8 equal parts instead of 6 equal parts.

Sample Response: 1 point
Grade 3 Math
Spring 2019 Item Release

Question 45

Question and Scoring Guidelines
Question 45

An expression is shown.
3 × 4 × 10

Select the two expressions that are equivalent to this expression.

- 3 × 40
- 30 + 4
- 12 × 10
- 12 × 40
- 10 + 12

Points Possible: 1

Content Cluster: Understand properties of multiplication and the relationship between multiplication and division.

Content Standard: Apply properties of operations as strategies to multiply and divide. For example, if 6 × 4 = 24 is known, then 4 × 6 = 24 is also known (Commutative Property of Multiplication); 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30 (Associative Property of Multiplication); knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56 (Distributive Property). Students need not use formal terms for these properties. (3.OA.5)

Depth of Knowledge: Level 2
e. Compare and/or contrast figures or statements
Scoring Guidelines

Rationale for First Option: **Key** – The student may use the Associative Property of Multiplication to multiply 4 and 10 to get 40 and then multiply by 3 to create an equivalent expression.

Rationale for Second Option: This is incorrect. The student may use the Associative Property of Multiplication to multiply 3 by 10 and then add 4 to the product instead of multiplying by 4.

Rationale for Third Option: **Key** – The student may use the Associative Property of Multiplication to multiply 3 and 4 to get 12 and then multiply by 10 to create an equivalent expression.

Rationale for Fourth Option: This is incorrect. The student may incorrectly apply the Distributive Property to identify an equivalent expression.

Rationale for Fifth Option: This is incorrect. The student may use the Associative Property of Multiplication to multiply 4 by 3 and then add 10 to the product instead of multiplying by 10.

Sample Response: 1 point

An expression is shown.

3 × 4 × 10

Select the **two** expressions that are equivalent to this expression.

- [ ] 3 × 40
- [ ] 30 + 4
- [x] 12 × 10
- [ ] 12 × 40
- [ ] 10 + 12
Grade 3 Math
Spring 2019 Item Release

Question 47

Question and Scoring Guidelines
Question 47

A shape is shown.

Select the two words that describe this shape.

- triangle
- hexagon
- rectangle
- pentagon
- quadrilateral

Points Possible: 1

Content Cluster: Reason with shapes and their attributes.

Content Standard: Draw and describe triangles, quadrilaterals (rhombuses, rectangles, and squares), and polygons (up to 8 sides) based on the number of sides and the presence or absence of square corners (right angles). (3.G.1)

Depth of Knowledge: Level 1
a. Recall, observe, or recognize a fact, definition, term, or property
Scoring Guidelines

Rationale for First Option: This is incorrect. The student may think that four-sided figures are called triangles.

Rationale for Second Option: This is incorrect. The student may think that four-sided figures are called hexagons.

Rationale for Third Option: Key – The student correctly recognizes that opposite sides of the shape are equal and that the shape has 4 right angles, which means that it is a rectangle.

Rationale for Fourth Option: This is incorrect. The student may think that four-sided figures are called pentagons.

Rationale for Fifth Option: Key – The student correctly recognizes that the figure is a quadrilateral because it has 4 sides.

Sample Response: 1 point

A shape is shown.

Select the two words that describe this shape.

- triangle
- hexagon
- rectangle
- pentagon
- quadrilateral
Grade 3 Math
Spring 2019 Item Release

Question 48

Question and Scoring Guidelines
Question 48

A diagram is shown.

Which measure would be found by counting all the unit squares in the rectangle?

A. area
B. length
C. volume
D. perimeter

Points Possible: 1

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

Content Standard: Recognize area as an attribute of plane figures and understand concepts of area measurement. (3.MD.5)
b. A plane figure which can be covered without gaps or overlaps by $n$ unit squares is said to have an area of $n$ square units.

Depth of Knowledge: Level 1
a. Recall, observe, or recognize a fact, definition, term, or property
Scoring Guidelines

Rationale for Option A: Key – The student correctly identifies that counting unit squares is the process used to find the area of a figure.

Rationale for Option B: This is incorrect. The student may only consider counting the number of squares on one side of the shape, which would give the length of that side.

Rationale for Option C: This is incorrect. The student may remember that counting squares measures space covered but confuse three-dimensional space (volume) and two-dimensional area.

Rationale for Option D: This is incorrect. The student may consider that by counting the number of square sides on the edges it would be possible to determine the perimeter, but this does not involve counting all the unit squares in the figure.

Sample Response: 1 point

A diagram is shown.

Which measure would be found by counting all the unit squares in the rectangle?

- area
- length
- volume
- perimeter