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Represent and solve problems involving multiplication and division.

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Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each.

MAFS.3.OA.1.2 19

Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each.

MAFS.3.OA.1.3 26

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.

MAFS.3.OA.1.4 34

Determine the unknown whole number in a multiplication or division equation relating three whole numbers

Understand properties of multiplication and the relationship between multiplication and division.

MAFS.3.OA.2.5 39

Apply properties of operations as strategies to multiply and divide

MAFS.3.OA.2.6 47

Understand division as an unknown-factor problem.

Multiply and divide within 100.

MAFS.3.OA.3.7 52

Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.



Solve problems involving the four operations, and identify and explain patterns in arithmetic.

MAFS.3.OA.4.860

Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

MAFS.3.OA.4.968

Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.

Domain 2 – Number and Operations Base Ten74

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

MAFS.3.NBT.1.175

Use place value understanding to round whole numbers to the nearest 10 or 100.

MAFS.3.NBT.1.282

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.

MAFS.3.NBT.1.389

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.

Domain 3 – Number and Operations – Fractions94

Develop understanding of fractions as numbers.

MAFS.3.NF.1.195

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 $1/b$.



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MAFS.3.NF.1.2 104

Understand a fraction as a number on the number line; represent fractions on a number line diagram.

- a. Represent a fraction $\frac{1}{b}$ 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 $\frac{1}{b}$ and that the endpoint of the part based at 0 locates the number $\frac{1}{b}$ on the number line.
- b. Represent a fraction $\frac{a}{b}$ on a number line diagram by marking off a lengths $\frac{1}{b}$ from 0. Recognize that the resulting interval has size $\frac{a}{b}$ and that its endpoint locates the number $\frac{a}{b}$ on the number line.

MAFS.3.NF.1.3 116

Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

- a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
- b. Recognize and generate simple equivalent fractions, e.g., $\frac{1}{2} = \frac{2}{4}$, $\frac{4}{6} = \frac{2}{3}$. Explain why the fractions are equivalent, e.g., by using a visual fraction model.
- c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.
- 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.

Domain 4 - Measurement and Data 132

Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

MAFS.3.MD.1.1 133

Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.



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MAFS.3.MD.1.2 145

Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units.

Represent and interpret data.

MAFS.3.MD.2.3 150

Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs.

MAFS.3.MD.2.4 160

Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.

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

MAFS.3.MD.3.5 171

Recognize area as an attribute of plane figures and understand concepts of area measurement.

- a. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.
- 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.

MAFS.3.MD.3.6 179

Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

MAFS.3.MD.3.7 188

Relate area to the operations of multiplication and addition.

- a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.



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- b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.
- 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 $a \times c$. Use area models to represent the distributive property in mathematical reasoning.
- d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

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

MAFS.3.MD.4.8 203

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.

Domain 5 – Geometry 216

Reason with shapes and their attributes.

MAFS.3.G.1.1 217

Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

MAFS.3.G.1.2 224

Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.



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Domain 1 - Operations and Algebraic Thinking - MAFS.3.OA.1.1

Domain

Title → Whole Number Products

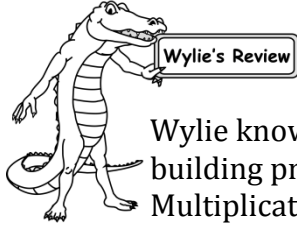
Standard Coding

Cluster

Represent and solve problems involving multiplication and division.

Standard

Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7 .



Wylie knows that multiplication is related to addition. Both operations are building processes and get a larger solution than the starting number. Multiplication may be used to find solutions when the problems involve combining equal sized groups or amounts.

Some third grade students are working on group science projects in Mr. Mitchell's room. There are 4 students in one group and 3 students in another group. How many students are working on group projects in Mr. Mitchell's room?



This represents 2 different sized groups and is an addition problem.

$$4 + 3 = 7$$

Some third grade students are working on group science projects. There are 4 groups of students working in Mr. Mitchell's room. Each group has 3 students in it. How many students are working on science projects in Mr. Mitchell's room?



This represents 4 groups with 3 students in each group.

These are equal sized groups, so multiplication can be used.

Repeated addition: $3 + 3 + 3 + 3 = 12$

Multiplication: $4 \times 3 = 12$



**Everglades K-12 Publishing's Mathematics Florida Standards Grade 3
Domain 1 – Operations and Algebraic Thinking – MAFS.3.OA.1.1**

Arrays are often used to show multiplication. An **array** shows objects arranged in a rectangular shape with rows and columns. Each row has the same number of objects and each column has the same number of objects.

- • • This represents 4 groups of 3 students.
- • • There are 4 rows with 3 objects in each row.
- • • $4 \times 3 = 12$
- • • The first factor tells the rows, and the second factor shows the columns.

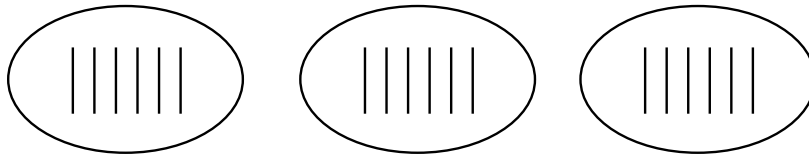
Mathematics vocabulary for multiplication includes the words **factor** and **product**. Factors are the quantities being multiplied. The product is the answer to a multiplication problem. Multiplication can be written vertically or horizontally, which uses equation format.

Vertical	Horizontal
$\begin{array}{r} 4 \text{ factor} \\ \times 3 \text{ factor} \\ \hline 12 \text{ product} \end{array}$	$4 \times 3 = 12$ factor \times factor = product

Example 1: Read the problem below and represent or show it using equal groups. Then write the multiplication equation for this problem including the product.

Jennifer bought 3 packages of cupcakes. Each package contained 6 cupcakes. How many cupcakes did Jennifer purchase?

The picture or representation of the equal groups might be different. Just make sure that there are 3 groups with 6 objects in each group.



$$3 \times 6 = 18$$

Jennifer purchased 18 cupcakes.



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Domain 1 – Operations and Algebraic Thinking – MAFS.3.OA.1.1

Example 2: Read the following word problem and select the equation that shows the total or solution for the problem.

Mrs. Singh has two bags of cookies. Six cookies are in one bag and eight cookies are in the other bag. How many cookies does Mrs. Singh have?

- $2 \times 6 = 12$ $6 \times 8 = 48$ $2 + 6 = 8$ $6 + 8 = 14$

$6 + 8$ is the correct choice. This is an addition problem. It cannot be multiplication because the groups are not equal.

Example 3: Which multiplication equation is represented by the following array?



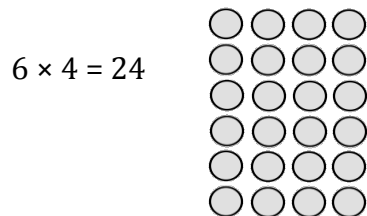
- $4 \times 2 = 8$ $2 \times 4 = 8$ $4 \times 4 = 16$ $2 \times 2 = 4$

The correct choice is $2 \times 4 = 8$. There are 2 rows with 4 columns in each row or 2 groups of 4. Remember in an array, the first factor shows the rows, and the second factor shows the columns.

Example 4: Read the problem below and represent it using an array. Also write the multiplication equation for this problem and find the answer for the problem.

The baker prepared some cookies for a party. He put them on a tray in 6 rows with 4 cookies in each row. How many cookies were in the tray?

The items in the arrays will be different, but all should have 6 rows with 4 columns to represent 6 groups of 4.

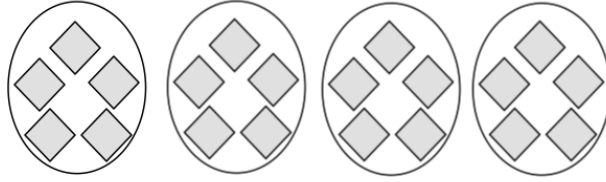


There are 24 cookies in the tray.



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Domain 1 – Operations and Algebraic Thinking – MAFS.3.OA.1.1**

Example 5: What are the factors and product represented by the picture below?



The picture represents 4 groups of 5 or $4 \times 5 = 20$. The factors are 4 and 5, and 20 is the product.

Example 6: Describe a situation that could represent $3 \times 5 = 15$.

Answers will vary. There should be 3 groups with 5 items in each group.

Justin has 3 bags with 5 donuts in each bag. Justin has a total of 15 donuts in the bags.

Example 7: Mrs. Purcell is arranging the desks in her room in rows and columns. She has 24 desks to arrange. Complete the table below to show 3 different arrangements for Mrs. Purcell's room.

	Number of Rows	Number of Columns
Arrangement 1		
Arrangement 2		
Arrangement 3		

Sample Response.

Rows and columns may be reversed within the factor pairs.

	Number of Rows	Number of Columns
Arrangement 1	2	12
Arrangement 2	3	8
Arrangement 3	4	6



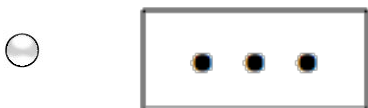
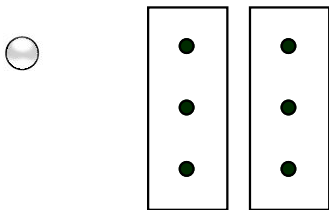
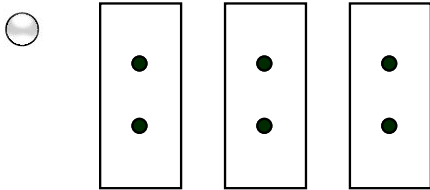
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Domain 1 – Operations and Algebraic Thinking – MAFS.3.OA.1.1

Now Try These:

1. Multiple Choice Response

Anton bought 2 cans of tennis balls. Each can had 3 balls in it. How many tennis balls did Anton buy?

Which picture below represents the equal groups in the problem above?



For 2-3, use the following problem.

There are 4 containers. Each container has 3 pencils in it. How many pencils are in the containers?

2. Graphic Response-Drawing

Represent the problem using equal groups.

3. Equation Response

Write the multiplication equation.

For 4-5, use the following problem.

Mr. Parker's vegetable garden has 5 rows of tomato plants. Each row has 5 plants. How many tomato plants are in Mr. Parker's garden?

4. Graphic Response-Drawing

Represent the problem using equal groups.



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Domain 1 – Operations and Algebraic Thinking – MAFS.3.OA.1.1

5. Equation Response

Write the multiplication equation.

For 6 - 11, Multiple Choice Response

6. Which of the following is another way to represent $2 + 2 + 2 + 2$?

- 2×4
 8×2
 2×2
 4×2

For 7 - 9, read the word problem and select the equation that shows the solution of the problem.

7. Sophia bought 3 packages of muffins. Each package had 6 muffins. How many muffins did Sophia buy?

- $3 + 6 = 9$
 $6 + 6 = 12$
 $3 \times 6 = 18$
 $3 + 3 + 3 = 9$

8. Jesse has a bookcase with 4 shelves. Each shelf has 5 books. How many books are in Jesse's bookcase?

- $4 + 5 = 9$
 $4 \times 4 = 16$
 $5 + 5 = 10$
 $4 \times 5 = 20$

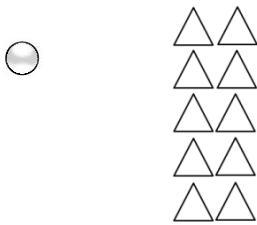
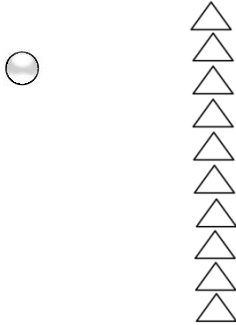
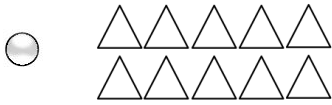
9. There are two boxes of crayons. One box has 8 crayons and the other has 5 crayons. How many crayons are in the boxes?

- $8 + 5 = 13$
 $8 \times 5 = 40$
 $5 \times 5 = 25$
 $8 + 8 = 16$



**Everglades K-12 Publishing's Mathematics Florida Standards Grade 3
Domain 1 – Operations and Algebraic Thinking – MAFS.3.OA.1.1**

10. Which array represents $2 \times 5 = 10$?



11. Which multiplication equation is represented by the following array?



- $3 \times 3 = 9$
- $5 \times 5 = 25$
- $3 \times 5 = 15$
- $5 \times 3 = 15$

12. Graphic Response-Drawing

Draw an array to show 6×3 .

13. Equation Response

What is the product of 6×3 ?

For 14 -15, use the following problem.

The campers are planning a canoe trip. Each canoe holds 4 campers. There will be 8 canoes used on the trip. How many campers will be on the canoe trip?

14. Graphic Response-Drawing

Draw an array to represent the problem.

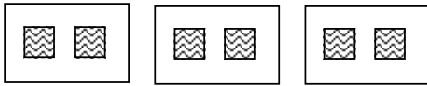


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Domain 1 – Operations and Algebraic Thinking – MAFS.3.OA.1.1**

For 15 – 17, Equation Response

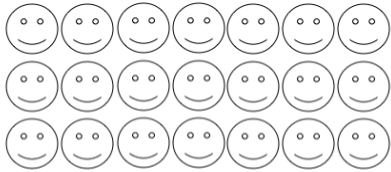
15. Write the equation that will solve the problem.

16. What are the factors and product represented by the following?



17. Multi-Select Response

What are the factors represented by the following array?



- 2
- 3
- 6
- 7

For 18 – 19, Natural Language Response

18. Describe a situation that could represent 4×7 .

19. Describe a situation that could represent 2×8 .

20. Table Response

Mr. Perkins is arranging chairs for a meeting to plan a surprise party. He has 12 chairs to arrange. Complete the table below to show 3 different arrangements for Mr. Perkins meeting.

	Number of Rows	Number of Columns
Arrangement 1		
Arrangement 2		
Arrangement 3		

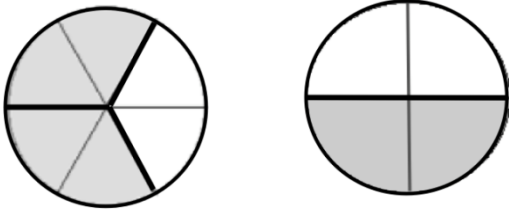


Develop understanding of fractions as numbers.

Formative Assessment 3

This Assessment has a variety of question types. Solve and Answer all of the problems. The bold print will let you know which kind of response is needed.

For 1 – 2, use the fraction models below to answer the questions.



1. Multi-Select Response

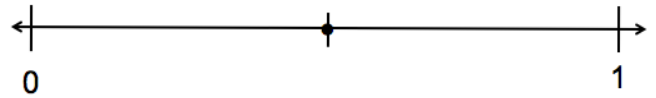
Which two choices represent both shaded portions of the models?

MAFS.3.NF.1.1

- $\frac{6}{4}$ and $\frac{1}{2}$
- $\frac{4}{6}$ and $\frac{2}{1}$
- $\frac{2}{3}$ and $\frac{1}{2}$
- $\frac{4}{6}$ and $\frac{2}{4}$

2a. Graphic Response - Drawing

The point on the number line represents one-half. Plot a point on the number line to represent the other shaded portion in question 1. MAFS.3.NF.1.1



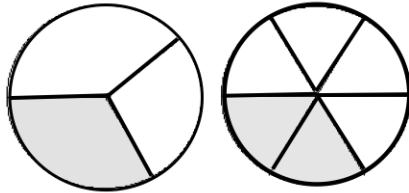
b. Natural Language Response

Tell why you chose that position on the number line.
MAFS.3.NF.1.1



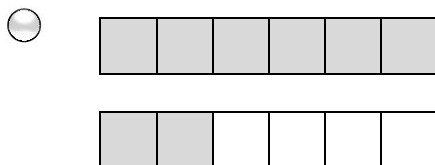
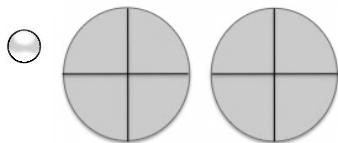
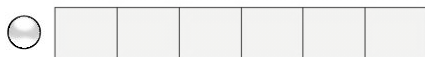
For 3 – 4, Multiple Choice Response

3. What are the equivalent fractions shown in the models?
 MAFS.3.NF.1.3



- $\frac{2}{6}$ and $\frac{2}{3}$
 $\frac{1}{3}$ and $\frac{2}{6}$
 $\frac{1}{3}$ and $\frac{4}{6}$
 $\frac{1}{3}$ and $\frac{1}{6}$

4. Which of the models below have been partitioned into eighths?
 MAFS.3.NF.1.1



5. Graphic Response - Drag and Drop

Allison, Bob, Carol, and Dan each bought the same size candy bar. Allison ate the most, Dan ate the least. Bob ate more than Carol but less than Allison.

- a. Use the numbers in the box below to complete the fractions that describe how much of the candy bar each person ate.
 MAFS.3.NF.1.3

Allison	$\frac{2}{\square}$	Carol	$\frac{2}{\square}$
Bob	$\frac{2}{\square}$	Dan	$\frac{2}{\square}$

8
6
4
3

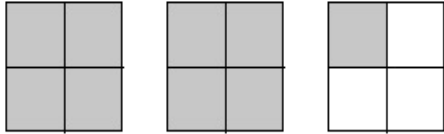
b. Equation Response

Order the fractions in the example from least to greatest.
 MAFS.3.NF.1.3



6a. Multi-Select Response

Choose all the numbers that represent the total amount of the shaded portions in the models below? MAFS.3.NF.1.1



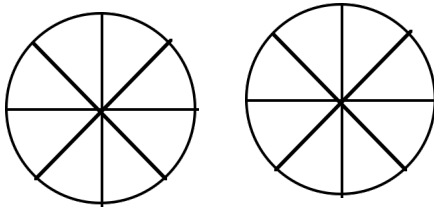
$\frac{9}{3}$



$\frac{9}{4}$

$1\frac{1}{3}$

$2\frac{1}{4}$

6b. Graphic Response – Drag and Drop. MAFS.3.NF.1.1



Each  represents one-eighth of the whole circle. Shade in 10 .

Write a fraction and a mixed number for the amount shaded.

$$\frac{\square}{\square} = \square \frac{\square}{\square}$$

7. Graphic Response - Drag and Drop

Use the numbers from the box below to fill in the missing numerators in the fractions so that each one is equivalent to $\frac{1}{2}$.

MAFS.3.NF.1.3

□	□
10	12
□	□
6	8

3 4 5 6

8. Table Response

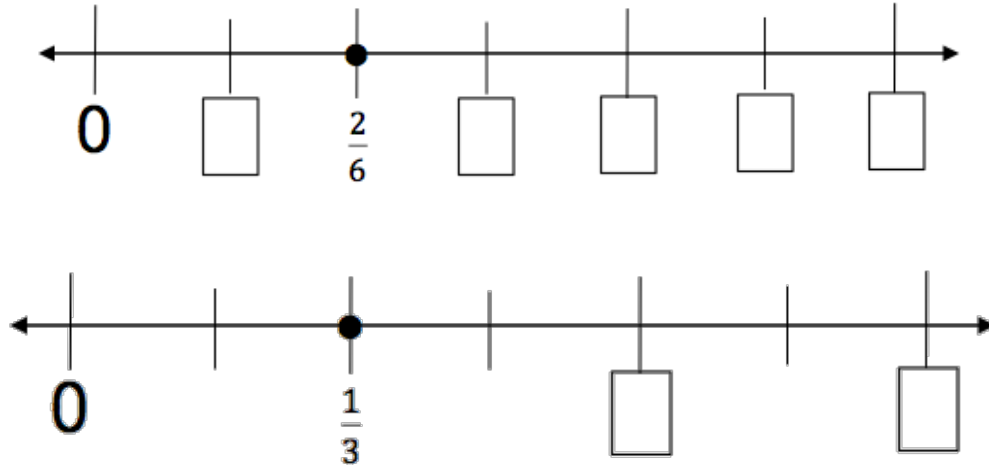
Write the numerator for each of the fractions so that they are equivalent to the whole numbers below. MAFS.3.NF.1.3

FRACTION	$\frac{\square}{4}$	$\frac{\square}{4}$	$\frac{\square}{4}$
WHOLE NUMBER	1	2	3



9. Equation Response

a. Fill in the frames to complete labeling the number lines. MAFS.3.NF.1.2

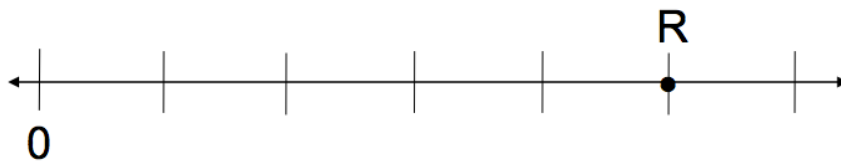


b. Write 3 pairs of equivalent fractions found on the number line above.

$$\frac{\square}{\square} = \frac{\square}{\square} \quad \frac{\square}{\square} = \frac{\square}{\square} \quad \frac{\square}{\square} = \frac{\square}{\square}$$

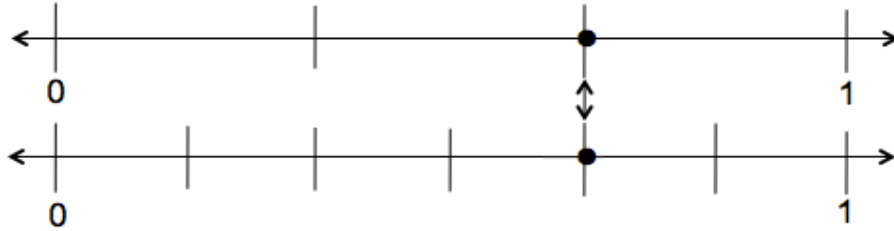
10. Graphic Response - Drawing/Graphing

Point "R" on the number line represents $\frac{5}{4}$. Draw a point on the number line that represents 1 whole. Label it, "Q". MAFS.3.NF.1.2



11. Equation Response

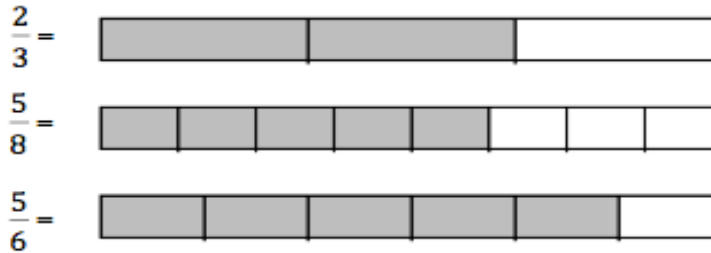
The arrows point to the same position on the two number lines. Write the two equivalent fractions that name these points? MAFS.3.NF.1.2



$$\frac{\square}{\square} = \frac{\square}{\square}$$

12. Multi-Select Response

Models for three fractions are shown below.



Using the models above, which two inequalities are correct? MAFS.3.NF.1.3

$\frac{2}{3} > \frac{5}{6}$

$\frac{5}{8} < \frac{2}{3}$

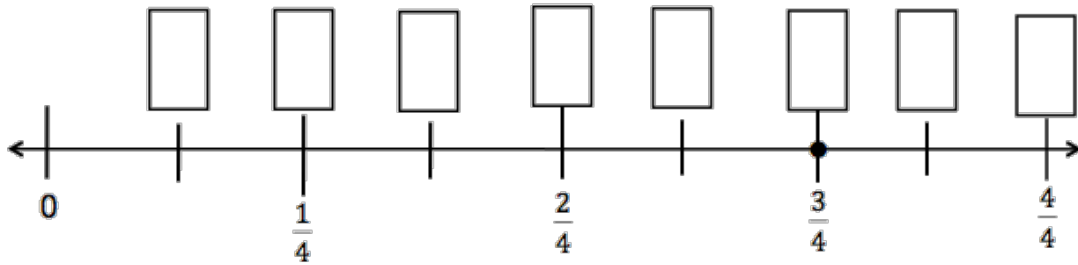
$\frac{5}{6} < \frac{5}{8}$

$\frac{5}{6} > \frac{2}{3}$



Everglades K-12 Publishing's Mathematics Florida Standards Grade 3
Domain 3 - Number and Operations - Fractions - MAFS.3.NF.1-3 - Formative 3

For 13 - 15, use the number line below.



13. Equation Response

The number line has been partitioned into fourths and eighths. Write the fractions that represent the eighths in each frame. MAFS.3.NF.1.1

14. Multiple Choice Response

Which of the fraction is equivalent to $\frac{3}{4}$? MAFS.3.NF.1.2

$\frac{4}{8}$

$\frac{5}{8}$

$\frac{6}{8}$

$\frac{7}{8}$

15a. Equation Response

Write two fractions from the number line above that are equivalent to one whole. MAFS.3.NF.1.3

$\frac{\square}{\square}$ and $\frac{\square}{\square}$



15b. Natural Language Response

What do you notice about both fractions?

16. Multiple Choice Response:

The point on the number line represents $\frac{3}{8}$. Which letter on the number line represents 1 whole? MAFS.3.NF.1.2, MAFS.3.NF.1.3



- letter "L"
- letter "M"
- letter "N"
- letter "P"

17. Table Response

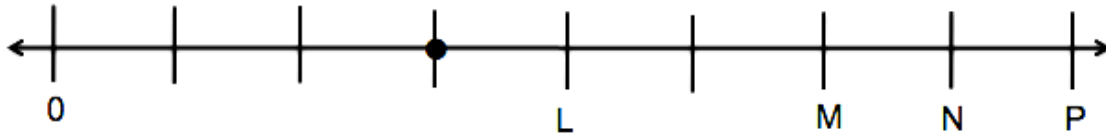
Models for two fractions are shown below.

Write a fraction that describes the shaded amount in each model. Put an "x" in the box that describes the size of the fraction. MAFS.3.NF.1.1

	Fraction	<1	=1	>1
	<div style="border: 1px solid black; width: 40px; height: 30px; margin: 0 auto;"></div> <hr style="width: 50%; margin: 0 auto;"/> <div style="border: 1px solid black; width: 40px; height: 30px; margin: 0 auto;"></div>			
	<div style="border: 1px solid black; width: 40px; height: 30px; margin: 0 auto;"></div> <hr style="width: 50%; margin: 0 auto;"/> <div style="border: 1px solid black; width: 40px; height: 30px; margin: 0 auto;"></div>			



For 18a and 18b, use the number line below.



18a. Multi-Select Response

If the point on the number line represents $\frac{3}{4}$, which letters on the number line represents whole numbers? MAFS.3.NF.2

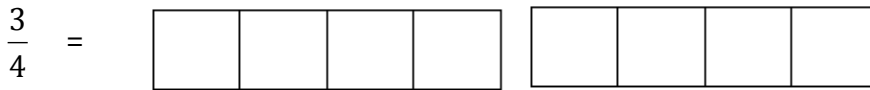
- letter "L"
- letter "M"
- letter "N"
- letter "P"

18b. Natural Language Response

Janice said, "If the point on the number line represented 1 whole, point 'L' would equal $\frac{4}{3}$." Is she correct? Explain how you know. MAFS.3.NF.1.2

19a. Hot Spot Response

Shade in an amount equal to the fraction. MAFS.3.NF.1.1

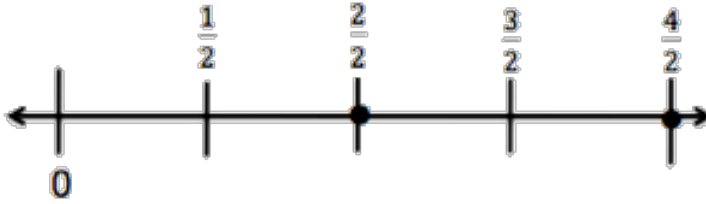


19b. Natural Language Response

In your own words, what is the difference between $\frac{3}{4}$ and $\frac{4}{3}$?



For 20 - 21, use the number line below



20. Graphic Response - Drawing

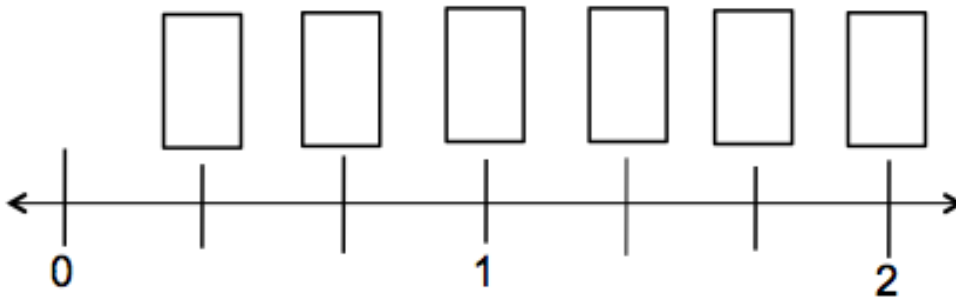
Circle two fractions that represent whole numbers on the number line.
MAFS.3.NF.1.3

21. Equation Response

Write the two whole numbers represented by the points on the number line.
MAFS.3.NF.1.3

and

For 22a - 22b, use the number line below to complete the tasks.



22a. Equation Response

Label the fractions on the number line. MAFS.3.NF.1.2

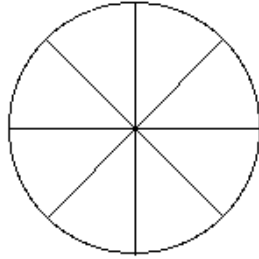
22b. Graphic Response - Hot Spot

Plot points for $\frac{3}{3}$ and $\frac{6}{3}$. MAFS.3.NF.1.2



23. Graphic Response - Hot Spot

Shade in an amount that is less than $\frac{4}{8}$. MAFS.3.NF.1.3



Write a fraction for the amount that was shaded.

$$\frac{\square}{\square}$$

24. Matching Response

Place an "x" in the box that describes the size of the fractions listed.
 MAFS.3.NF.1.3

	< 1	= 1	> 1
$\frac{5}{6}$			
$\frac{3}{3}$			
$\frac{5}{4}$			
$\frac{6}{3}$			



25. Graphic Response - Drag and Drop

Draw a line from the fractions below to their approximate point of location on the number line. MAFS.3.NF.1.2

