

Name \_\_\_\_\_

Date \_\_\_\_\_

1. Multiply or divide. Draw a model to explain your thinking.

a.  $\frac{1}{2} \times 6$

b.  $\frac{1}{2} \times 7$

c.  $\frac{3}{4} \times 12$

d.  $\frac{2}{5} \times 30$

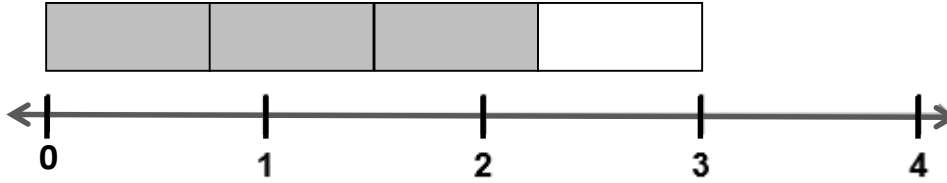
e.  $\frac{1}{3}$  of 2 feet = \_\_\_\_\_ inches

f.  $\frac{1}{6}$  of 3 yards = \_\_\_\_\_ feet

g.  $\left(3 + \frac{1}{2}\right) \times 14$

h.  $4\frac{2}{3} \times 13$

2. If the whole bar is 3 units long, what is the length of the shaded part of the bar? Write a multiplication equation for the diagram, and then solve.



3. Circle the expression(s) that are equal to  $\frac{3}{5} \times 6$ . Explain why the others are *not* equal using words, pictures, or numbers.
- a.  $3 \times (6 \div 5)$
- b.  $3 \div (5 \times 6)$
- c.  $(3 \times 6) \div 5$
- d.  $3 \times \frac{6}{5}$

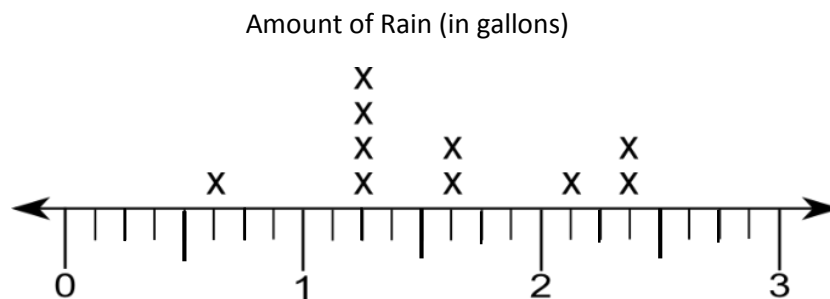
4. Write the following as expressions.

a. One-third the sum of 6 and 3.

b. Four times the quotient of 3 and 4.

c. One-fourth the difference between  $\frac{2}{3}$  and  $\frac{1}{2}$ .

5. Mr. Schaum used 10 buckets to collect rainfall in various locations on his property. The following line plot shows the amount of rain collected in each bucket in gallons. Write an expression that includes multiplication to show how to find the total amount of water collected in gallons. Then, solve your expression.



6. Mrs. Williams uses the following recipe for crispy rice treats. She decides to make  $\frac{2}{3}$  of the recipe.

2 cups melted butter  
24 oz marshmallows  
13 cups rice crispy cereal

- a. How much of each ingredient will she need? Write an expression that includes multiplication. Solve by multiplying.
- b. How many fluid ounces of butter will she use? (Use your measurement conversion chart, if you wish.)
- c. When the crispy rice treats have cooled, Mrs. Williams cuts them into 30 equal pieces. She gives two-fifths of the treats to her son and takes the rest to school. How many treats will Mrs. Williams take to school? Use any method to solve.

### Mid-Module Assessment Task Standards Addressed

### Topics A–D

#### Write and interpret numerical expressions.

- 5.OA.1** Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
- 5.OA.2** Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation “add 8 and 7, then multiply by 2” as  $2 \times (8 + 7)$ . Recognize that  $3 \times (18932 + 921)$  is three times as large as  $18932 + 921$ , without having to calculate the indicated sum or product.*

#### Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

- 5.NF.3** Interpret a fraction as division of the numerator by the denominator ( $\frac{a}{b} = a \div b$ ). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret  $\frac{3}{4}$  as the result of dividing 3 by 4, noting that  $\frac{3}{4}$  multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size  $\frac{3}{4}$ . If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*
- 5.NF.4** Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
- a. Interpret the product  $(\frac{a}{b}) \times q$  as  $a$  parts of a partition of  $q$  into  $b$  parts; equivalently, as the result of a sequence of operations  $a \times q \div b$ . *For example, use a visual fraction model to show  $(\frac{2}{3}) \times 4 = \frac{8}{3}$  and create a story context for this equation. Do the same with  $(\frac{2}{3}) \times (\frac{4}{5}) = \frac{8}{15}$ . (In general,  $(\frac{a}{b}) \times (\frac{c}{d}) = \frac{ac}{bd}$ .)*
- 5.NF.6** Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

#### Convert like measurement units within a given measurement system.

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

#### Represent and interpret data.

- 5.MD.2** Make a line plot to display a data set of measurements in fractions of a unit ( $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}$ ). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*

## Evaluating Student Learning Outcomes

A Progression Toward Mastery is provided to describe steps that illuminate the gradually increasing understandings that students develop *on their way to proficiency*. In this chart, this progress is presented from left (Step 1) to right (Step 4). The learning goal for students is to achieve Step 4 mastery. These steps are meant to help teachers and students identify and celebrate what the students CAN do now and what they need to work on next.

A Progression Toward Mastery				
Assessment Task Item and Standards Assessed	STEP 1 Little evidence of reasoning without a correct answer.  (1 Point)	STEP 2 Evidence of some reasoning without a correct answer.  (2 Points)	STEP 3 Evidence of some reasoning with a correct answer or evidence of solid reasoning with an incorrect answer. (3 Points)	STEP 4 Evidence of solid reasoning with a correct answer.  (4 Points)
<b>1</b>  <b>5.NF.4a</b> <b>5.MD.1</b>	The student draws valid models and/or arrives at the correct product for three or fewer items.	The student draws valid models and/or arrives at the correct product for four or five items.	The student draws valid models and/or arrives at the correct product for six or seven items.	The student correctly answers all eight items and draws valid models: <ul style="list-style-type: none"> <li>a. 3</li> <li>b. <math>3\frac{1}{2}</math></li> <li>c. 9</li> <li>d. 12</li> <li>e. 8 inches</li> <li>f. <math>1\frac{1}{2}</math> feet</li> <li>g. 49</li> <li>h. <math>60\frac{2}{3}</math></li> </ul>
<b>2</b>  <b>5.NF.4a</b> <b>5.NF.3</b>	The student shows no evidence of being able to express the length of the shaded area.	The student approximates the length of the shaded bar but does not write a multiplication equation.	The student is able to write the correct multiplication equation for the diagram but incorrectly states the length of the shaded part of the bar.	The student correctly: <ul style="list-style-type: none"> <li>▪ Writes a multiplication equation: <math>\frac{3}{4} \times 3 = \frac{9}{4}</math> or <math>2\frac{1}{4}</math>.</li> <li>▪ Finds the length of the shaded part of the bar as <math>\frac{9}{4}</math> or <math>2\frac{1}{4}</math>.</li> </ul>



## A Progression Toward Mastery

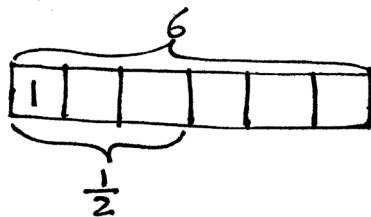
<b>3</b>  <b>5.OA.1</b>	The student is unable to identify any equal expressions.	The student correctly identifies one equal expression.	The student correctly identifies two equal expressions.	The student correctly: <ul style="list-style-type: none"> <li>Identifies (a), (c), and (d) as equal to <math>\frac{3}{5} \times 6</math>.</li> <li>Explains why (b) is not equal.</li> </ul>
<b>4</b>  <b>5.OA.2</b>	The student is unable to write expressions for (a), (b), or (c).	The student correctly writes one expression.	The student correctly writes two expressions.	The student correctly writes three expressions: <ul style="list-style-type: none"> <li>a. <math>\frac{1}{3} \times (6 + 3)</math></li> <li>b. <math>4 \times (3 \div 4)</math> or <math>4 \times \frac{3}{4}</math></li> <li>c. <math>\frac{1}{4} \times \left(\frac{2}{3} - \frac{1}{2}\right)</math></li> </ul>
<b>5</b>  <b>5.NF.4a</b> <b>5.NF.6</b> <b>5.MD.2</b>	The student is neither able to produce a multiplication expression that identifies the data from the line plot nor find the total gallons of water collected.	The student is either able to write a multiplication expression that accounts for all data points on the line plot or find the total gallons of water collected.	The student is able to write a multiplication expression that correctly accounts for all the data points on the line plot when finding the total gallons of water collected but makes a calculation error.	The student correctly: <ul style="list-style-type: none"> <li>Accounts for all data points in the line plot in the multiplication expression.</li> <li>Finds the total gallons of water collected as <math>15\frac{6}{8}</math> gallons or <math>15\frac{3}{4}</math> gallons.</li> </ul>
<b>6</b>  <b>5.NF.4a</b> <b>5.NF.6</b> <b>5.MD.1</b>	The student correctly calculates two correct answers.	The student is able to correctly calculate three correct answers.	The student is able to correctly calculate four correct answers.	The student correctly: <ul style="list-style-type: none"> <li>a. Calculates <math>1\frac{1}{3}</math> c butter, 16 oz of marshmallows, <math>8\frac{2}{3}</math> c of cereal.</li> <li>b. Converts <math>1\frac{1}{3}</math> c butter to <math>10\frac{2}{3}</math> fluid ounces.</li> <li>c. Uses an equation or model and finds the number of treats taken to school as 18 treats.</li> </ul>

Name Hayley

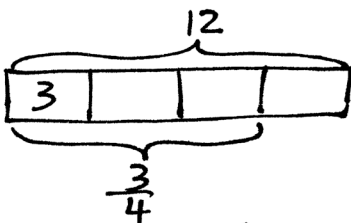
Date \_\_\_\_\_

1. Multiply or divide. Draw a model to explain your thinking.

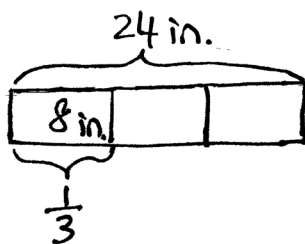
a.  $\frac{1}{2} \times 6 = 6 \div 2 = 3$



c.  $\frac{3}{4} \times 12 = 9$

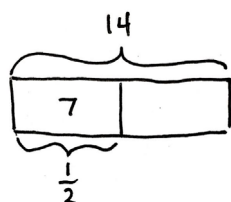


e.  $\frac{1}{3}$  of 2 feet = 8 inches  
 $2 \times 12 \text{ inches} = 24 \text{ inches}$

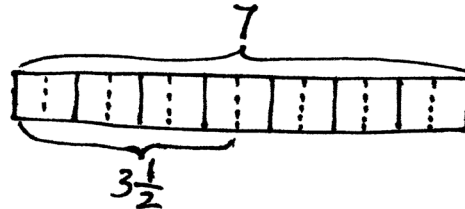


g.  $(3 + \frac{1}{2}) \times 14$

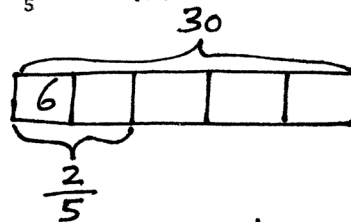
$= (3 \times 14) + (\frac{1}{2} \times 14)$   
 $= 42 + 7$   
 $= 49$



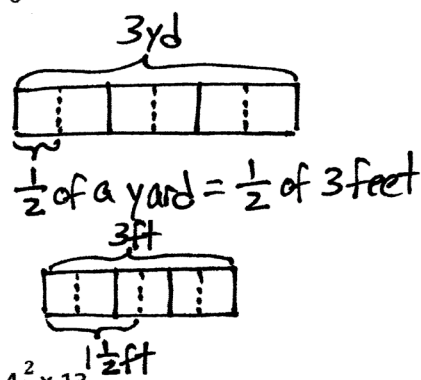
b.  $\frac{1}{2} \times 7 = 7 \div 2 = 3\frac{1}{2}$



d.  $\frac{2}{5} \times 30 = 12$

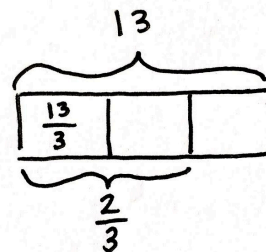


f.  $\frac{1}{6}$  of 3 yards = 1 1/2 feet



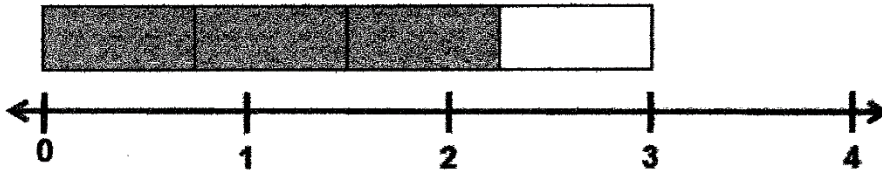
h.  $4\frac{2}{3} \times 13$

$= (4 \times 13) + (\frac{2}{3} \times 13)$   
 $= 52 + \frac{2 \times 13}{3}$   
 $= 52 + \frac{26}{3}$   
 $= 52 + 8\frac{2}{3}$   
 $= 60\frac{2}{3}$





2. If the whole bar is 3 units long, what is the length of the shaded part of the bar? Write a multiplication equation for the diagram, and then solve.



$$\frac{3}{4} \times 3 = \frac{3 \times 3}{4} = \frac{9}{4} = 2\frac{1}{4}$$

The shaded part of the bar is  $2\frac{1}{4}$  units long.

3. Circle the expression(s) that are equal to  $\frac{3}{5} \times 6$ . Explain why the others are *not* equal using words, pictures, or numbers.

a.  $3 \times (6 \div 5)$

b.  $3 \div (5 \times 6)$

$$= 3 \div 30$$

$$= 0.1$$

c.  $(3 \times 6) \div 5$

d.  $3 \times \frac{6}{5}$

4. Write the following as expressions.

- a. One-third the sum of 6 and 3.

$$\frac{1}{3} \times (6 + 3)$$

- b. Four times the quotient of 3 and 4.

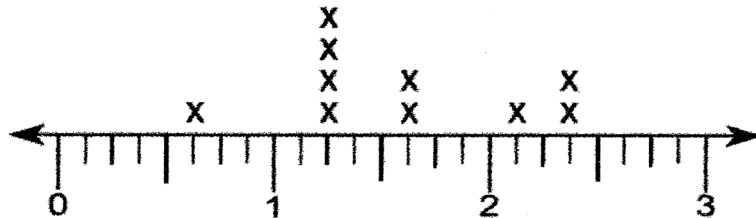
$$4 \times (3 \div 4)$$

- c. One-fourth the difference between  $\frac{2}{3}$  and  $\frac{1}{2}$ .

$$\frac{1}{4} \times \left( \frac{2}{3} - \frac{1}{2} \right)$$

5. Mr. Schaum used 10 buckets to collect rainfall in various locations on his property. The following line plot shows the amount of rain collected in each bucket in gallons. Write an expression that includes multiplication to show how to find the total amount of water collected in gallons. Then solve your expression.

Amount of Rain (in gallons)



$$\begin{aligned} & \frac{5}{8} + (4 \times 1\frac{2}{8}) + (2 \times 1\frac{5}{8}) + 2\frac{1}{8} + (2 \times 2\frac{3}{8}) \\ &= \frac{5}{8} + 4 + \frac{4 \times 2}{8} + 2 + \frac{2 \times 5}{8} + 2\frac{1}{8} + 4 + \frac{2 \times 3}{8} \\ &= 12 + \frac{5}{8} + \frac{8}{8} + \frac{10}{8} + \frac{1}{8} + \frac{6}{8} \\ &= 13 + \frac{22}{8} \\ &= 15\frac{6}{8} = 15\frac{3}{4} \end{aligned}$$

Mr. Schaum collected  $15\frac{3}{4}$  gallons of water.

6. Mrs. Williams uses the following recipe for crispy rice treats. She decides to make  $\frac{2}{3}$  of the recipe.

2 cups melted butter  
24 oz marshmallows  
13 cups rice crispy cereal

- a. How much of each ingredient will she need? Write an expression that includes multiplication. Solve by multiplying.

Butter:  $\frac{2}{3} \times 2 \text{ cups} = \frac{2 \times 2}{3} = \frac{4}{3} = 1\frac{1}{3} \text{ cups}$

Marshmallows:  $\frac{2}{3} \times 24 \text{ oz.} = \frac{2 \times 24}{3} = \frac{48}{3} = 16 \text{ oz.}$

Cereal:  $\frac{2}{3} \times 13 \text{ cups} = \frac{2 \times 13}{3} = \frac{26}{3} = 8\frac{2}{3} \text{ cups}$

she will need  $1\frac{1}{3}$  cups of butter, 16 ounces of marshmallows, and  $8\frac{2}{3}$  cups of rice crispy cereal.

- b. How many fluid ounces of butter will she use? (Use your measurement conversion chart if you wish.)

1 cup = 8 ounces

$1\frac{1}{3} \times 8 = (1 \times 8) + (\frac{1}{3} \times 8)$

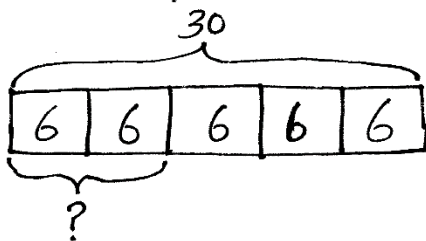
$= 8 + \frac{8}{3}$

$= 8 + 2\frac{2}{3}$

$= 10\frac{2}{3}$

She will use  $10\frac{2}{3}$  fluid ounces of butter.

- c. When the crispy rice treats have cooled, Mrs. Williams cuts them into 30 equal pieces. She gives two-fifths of the treats to her son and takes the rest to school. How many treats will Mrs. Williams take to school? Use any method to solve.



$$\begin{array}{r} 30 \\ -12 \\ \hline 18 \end{array}$$

Mrs. Williams will take 18 treats to school.

Name \_\_\_\_\_

Date \_\_\_\_\_

1. Multiply or divide. Draw a model to explain your thinking.

a.  $\frac{1}{3} \times \frac{1}{4}$

b.  $\frac{3}{4}$  of  $\frac{1}{3}$

c.  $\frac{3}{4} \times \frac{3}{5}$

d.  $4 \div \frac{1}{3}$

e.  $5 \div \frac{1}{4}$

f.  $\frac{1}{4} \div 5$

2. Multiply or divide using any method.

a.  $1.5 \times 32$

b.  $1.5 \times 0.32$

c.  $12 \div 0.03$

d.  $1.2 \div 0.3$

e.  $12.8 \times \frac{3}{4}$

f.  $102.4 \div 3.2$

3. Fill in the chart by writing an equivalent expression.

a.	One-fifth the sum of one-half and one-third	
b.	Two and one-half times the sum of nine and twelve	
c.	Twenty-four divided by the difference between $1\frac{1}{2}$ and $\frac{3}{4}$	

4. A castle has to be guarded 24 hours a day. Five knights are ordered to split each day's guard duty equally. How long will each knight spend on guard duty in one day?
- a. Record your answer in hours.
- b. Record your answer in hours and minutes.
- c. Record your answer in minutes.

5. On the blank, write a division expression that matches the situation.

- a. \_\_\_\_\_ Mark and Jada share 5 yards of ribbon equally. How much ribbon will each get?
- b. \_\_\_\_\_ It takes half of a yard of ribbon to make a bow. How many bows can be made with 5 yards of ribbon?
- c. Draw a diagram for each problem and solve.

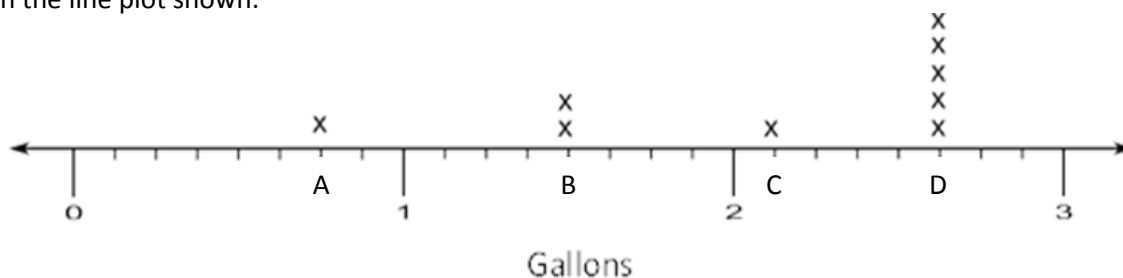
d. Could either of the problems also be solved by using  $\frac{1}{2} \times 5$ ? If so, which one(s)? Explain your thinking.

6. Jackson claims that multiplication always makes a number bigger. He gave the following examples:

- If I take 6, and I multiply it by 4, I get 24, which is bigger than 6.
- If I take  $\frac{1}{4}$ , and I multiply it by 2 (whole number), I get  $\frac{2}{4}$ , or  $\frac{1}{2}$ , which is bigger than  $\frac{1}{4}$ .

Jackson's reasoning is incorrect. Give an example that proves he is wrong, and explain his mistake using pictures, words, or numbers.

7. Jill collected honey from 9 different beehives and recorded the amount collected, in gallons, from each hive in the line plot shown:



a. She wants to write the value of each point marked on the number line above (Points A–D) in terms of the largest possible whole number of gallons, quarts, and pints. Use the line plot above to fill in the blanks with the correct conversions. (The first one is done for you.)

A. 0 gal 3 qt 0 pt

B. \_\_\_\_\_ gal \_\_\_\_\_ qt \_\_\_\_\_ pt

C. \_\_\_\_\_ gal \_\_\_\_\_ qt \_\_\_\_\_ pt

D. \_\_\_\_\_ gal \_\_\_\_\_ qt \_\_\_\_\_ pt



- b. Find the total amount of honey collected from the five hives that produced the most honey.
- c. Jill collected a total of 19 gallons of honey. If she distributes all of the honey equally between 9 jars, how much honey will be in each jar?
- d. Jill used  $\frac{3}{4}$  of a jar of honey for baking. How much honey did she use baking?

- e. Jill's mom used  $\frac{1}{4}$  of a gallon of honey to bake 3 loaves of bread. If she used an equal amount of honey in each loaf, how much honey did she use for 1 loaf?
- f. Jill's mom stored some of the honey in a container that held  $\frac{3}{4}$  of a gallon. She used half of this amount to sweeten tea. How much honey, in cups, was used in the tea? Write an equation, and draw a tape diagram.
- g. Jill uses some of her honey to make lotion. If each bottle of lotion requires  $\frac{1}{4}$  gallon, and she uses a total of 3 gallons, how many bottles of lotion does she make?

End-of-Module Assessment Task  
Standards Addressed

## Topics A–H

**Write and interpret numerical expressions.**

- 5.OA.1** Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
- 5.OA.2** Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation “add 8 and 7, then multiply by 2” as  $2 \times (8 + 7)$ . Recognize that  $3 \times (18932 + 921)$  is three times as large as  $18932 + 921$ , without having to calculate the indicated sum or product.*

**Perform operations with multi-digit whole numbers and with decimals to hundredths.**

- 5.NBT.7** Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

**Apply and extend previous understandings of multiplication and division to multiply and divide fractions.**

- 5.NF.3** Interpret a fraction as division of the numerator by the denominator ( $\frac{a}{b} = a \div b$ ). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret  $\frac{3}{4}$  as the result of dividing 3 by 4, noting that  $\frac{3}{4}$  multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size  $\frac{3}{4}$ . If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*
- 5.NF.4** Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
- a. Interpret the product of  $(\frac{a}{b}) \times q$  as  $a$  parts of a partition of  $q$  into  $b$  equal parts; equivalently, as the result of a sequence of operations  $a \times q \div b$ . *For example, use a visual fraction model to show  $(\frac{2}{3}) \times 4 = \frac{8}{3}$ , and create a story context for this equation. Do the same with  $(\frac{2}{3}) \times (\frac{4}{5}) = \frac{8}{15}$ . (In general,  $(\frac{a}{b}) \times (\frac{c}{d}) = \frac{ac}{bd}$ .)*
- 5.NF.5** Interpret multiplication as scaling (resizing) by:
- a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.



- b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence  $\frac{a}{b} = \frac{n \times a}{n \times b}$  to the effect of multiplying  $\frac{a}{b}$  by 1.

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

**5.NF.7** Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (Students capable of multiplying fractions can generally develop strategies to divide fractions by reasoning about the relationship between multiplication and division. However, division of a fraction by a fraction is not a requirement at this grade level.)

- a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for  $(\frac{1}{3}) \div 4$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that  $(\frac{1}{3}) \div 4 = \frac{1}{12}$  because  $(\frac{1}{12}) \times 4 = \frac{1}{3}$ .*
- b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for  $4 \div (\frac{1}{5})$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that  $4 \div (\frac{1}{5}) = 20$  because  $20 \times (\frac{1}{5}) = 4$ .*
- c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share  $\frac{1}{2}$  lb of chocolate equally? How many  $\frac{1}{3}$ -cup servings are in 2 cups of raisins?*

**Convert like measurement units within a given measurement system.**

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

**Represent and interpret data.**

**5.MD.2** Make a line plot to display a data set of measurements in fractions of a unit ( $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$ ). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*

## Evaluating Student Learning Outcomes

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A Progression Toward Mastery				
Assessment Task Item and Standards Assessed	<b>STEP 1</b> <b>Little evidence of reasoning without a correct answer.</b>  <b>(1 Point)</b>	<b>STEP 2</b> <b>Evidence of some reasoning without a correct answer.</b>  <b>(2 Points)</b>	<b>STEP 3</b> <b>Evidence of some reasoning with a correct answer or evidence of solid reasoning with an incorrect answer.</b>  <b>(3 Points)</b>	<b>STEP 4</b> <b>Evidence of solid reasoning with a correct answer.</b>  <b>(4 Points)</b>
<b>1</b>  <b>5.NF.4</b> <b>5.NF.7</b>	The student draws valid models and/or arrives at the correct answer for two or more items.	The student draws valid models and/or arrives at the correct answer for three or more items.	The student draws valid models and/or arrives at the correct answer for four or more items.	The student correctly answers all eight items and draws valid models: a. $\frac{1}{12}$ b. $\frac{3}{12}$ c. $\frac{9}{20}$ d. 12 e. 20 f. $\frac{1}{20}$
<b>2</b>  <b>5.NBT.7</b>	The student has two or fewer correct answers.	The student has three correct answers.	The student has four correct answers.	The student correctly answers all six items: a. 48 b. 0.48 c. 400 d. 4 e. 9.6 or $\frac{384}{40}$ or any equivalent fraction f. 32



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<b>3</b>  <b>5.OA.2</b>	The student has no correct answers.	The student has one correct answer.	The student has two correct answers.	The student correctly answers all three items: a. $\frac{1}{5} \times \left(\frac{1}{2} + \frac{1}{3}\right)$ b. $(9 + 12) \times 2\frac{1}{2}$ or $2\frac{1}{2} \times (9 + 12)$ c. $24 \div \left(1\frac{1}{2} - \frac{3}{4}\right)$
<b>4</b>  <b>5.NF.3</b> <b>5.NF.6</b> <b>5.MD.1</b>	The student has no correct answers.	The student has one correct answer.	The student has two correct answers.	The student correctly answers all three items: a. 4.8 hours b. 4 hours, 48 minutes c. 288 minutes
<b>5</b>  <b>5.NF.6</b> <b>5.NF.7</b>	The student gives one or fewer correct responses among Parts (a), (b), (c), and (d).	The student gives at least two correct responses among Parts (a), (b), (c), and (d).	The student gives at least three correct responses among Parts (a), (b), (c), and (d).	The student correctly answers all four items: a. $5 \div 2$ b. $5 \div \frac{1}{2}$ c. Draws a correct diagram for both expressions and solves. d. Correctly identifies $5 \div 2$ and offers solid reasoning.
<b>6</b>  <b>5.NF.5</b>	The student gives both a faulty example and faulty explanation.	The student gives either a faulty example or explanation.	The student gives a valid example or clear explanation.	The student is able to give a correct example and clear explanation.



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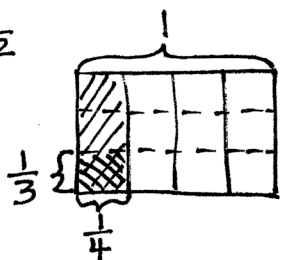
<p><b>7</b></p> <p><b>5.NF.3</b></p> <p><b>5.NF.4</b></p> <p><b>5.NF.6</b></p> <p><b>5.NF.7</b></p> <p><b>5.MD.1</b></p> <p><b>5.MD.2</b></p>	The student has two or fewer correct answers.	The student has three correct answers.	The student has five correct answers.	<p>The student correctly answers all seven items:</p> <p>a.</p> <p>A. 0 gal, 3 qt, 0 pt</p> <p>B. 1 gal, 2 qt, 0 pt</p> <p>C. 2 gal, 0 qt, 1 pt</p> <p>D. 2 gal, 2 qt, 1 pt</p> <p>b. 13 gal, 1 pt</p> <p>c. <math>2\frac{1}{9}</math> gal</p> <p>d. <math>1\frac{7}{12}</math> gal</p> <p>e. <math>\frac{1}{12}</math> gal</p> <p>f. 6 c</p> <p>g. 12 bottles</p>
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Name Seth

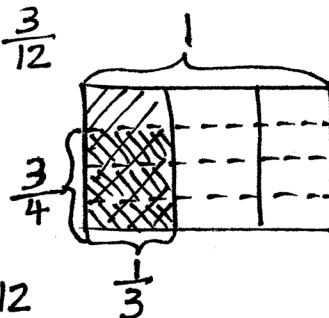
Date \_\_\_\_\_

1. Multiply or divide. Draw a model to explain your thinking.

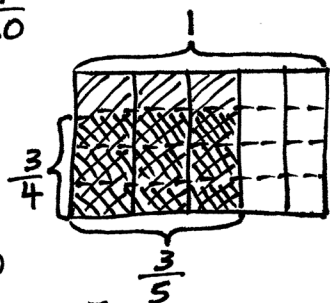
a.  $\frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$



b.  $\frac{3}{4}$  of  $\frac{1}{3} = \frac{3}{12}$



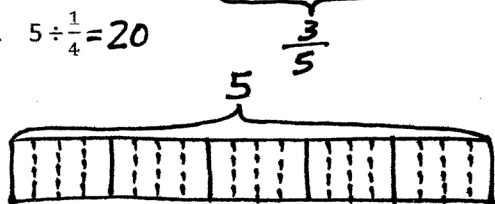
c.  $\frac{3}{4} \times \frac{3}{5} = \frac{9}{20}$



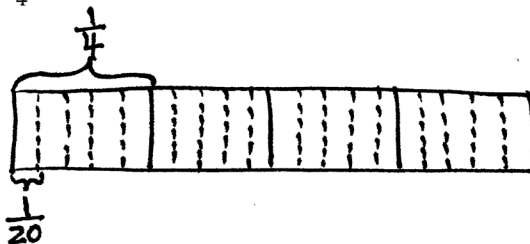
d.  $4 \div \frac{1}{3} = 12$



e.  $5 \div \frac{1}{4} = 20$



f.  $\frac{1}{4} \div 5 = \frac{1}{20}$



2. Multiply or divide using any method.

a.  $1.5 \times 32 = 48.0$

$$\begin{array}{r} 15 \text{ (tenths)} \\ \times 32 \\ \hline 30 \\ + 450 \\ \hline 480 \text{ (tenths)} \end{array}$$

c.  $12 \div 0.03$

$$\begin{aligned} &= (12 \times 100) \div (0.03 \times 100) \\ &= 1,200 \div 3 \\ &= 400 \end{aligned}$$

e.  $12.8 \times \frac{3}{4}$

$$\begin{aligned} &= (12 \times \frac{3}{4}) + (\frac{8}{10} \times \frac{3}{4}) \\ &= 9 + \frac{24}{40} \\ &= 9\frac{24}{40} = 9\frac{3}{5} \end{aligned}$$

b.  $1.5 \times 0.32$

$$\begin{aligned} &= (1 \times 0.32) + (0.5 \times 0.32) \\ &= 0.32 + 0.16 \\ &= 0.48 \end{aligned}$$

d.  $1.2 \div 0.3$

$$\begin{aligned} &= (1.2 \times 10) \div (0.3 \times 10) \\ &= 12 \div 3 \\ &= 4 \end{aligned}$$

f.  $102.4 \div 3.2$

$$\begin{aligned} &= (102.4 \times 10) \div (3.2 \times 10) \\ &= 1,024 \div 32 \\ &= 32 \end{aligned}$$

$$\begin{array}{r} 32 \\ 32 \overline{) 1,024} \\ \underline{-96} \phantom{00} \\ 64 \\ \underline{-64} \\ 0 \end{array}$$



3. Fill in the chart by writing an equivalent expression.

a.	One-fifth the sum of one-half and one-third	$\frac{1}{5} \times (\frac{1}{2} + \frac{1}{3})$
b.	Two and one-half times the sum of nine and twelve	$2\frac{1}{2} \times (9 + 12)$
c.	Twenty-four divided by the difference between $1\frac{1}{2}$ and $\frac{3}{4}$	$24 \div (1\frac{1}{2} - \frac{3}{4})$

4. A castle has to be guarded 24 hours a day. Five knights are ordered to split each day's guard duty equally. How long will each knight spend on guard duty in one day?

- a. Record your answer in hours.

$$\begin{array}{r} 4.8 \\ 5 \overline{)24.0} \\ \underline{-20} \phantom{0} \\ 40 \\ \underline{-40} \\ 0 \end{array}$$

Each Knight will spend 4.8 hours on guard duty in one day.

- b. Record it in hours and minutes.

$$\frac{1}{10} \text{ of } 60 \text{ min} = 6 \text{ min}$$

$$\frac{8}{10} \text{ of } 60 \text{ min} = 48 \text{ min}$$

$$4.8 \text{ hours} = 4 \text{ hours } 48 \text{ minutes}$$

Each Knight will spend 4 hours and 48 minutes on guard duty in one day.

- c. Record your answer in minutes.

$$1 \text{ hour} = 60 \text{ minutes}$$

$$4.8 \text{ hour} = \underline{\hspace{1cm}} \text{ min.}$$

$$= 4.8 \times 1 \text{ hr}$$

$$= 4.8 \times 60 \text{ min}$$

$$= 288.0 \text{ min}$$

$$\begin{array}{r} 48 \text{ (tenths)} \\ \times 60 \\ \hline 2880 \\ +2880 \\ \hline 2,880 \text{ (tenths)} \end{array}$$

Each Knight will spend 288 minutes on guard duty in one day.

5. On the blank, write a division expression that matches the situation.

a.  $5 \div 2$

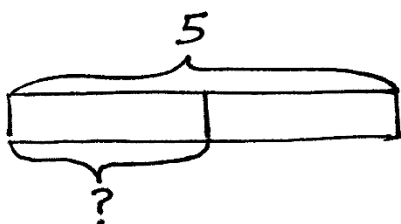
Mark and Jada share 5 yards of ribbon equally. How much ribbon will each get?

b.  $5 \div \frac{1}{2}$

It takes half of a yard of ribbon to make a bow. How many bows can be made with 5 yards of ribbon?

c. Draw a diagram for each problem and solve.

$$5 \div 2 = 2\frac{1}{2}$$

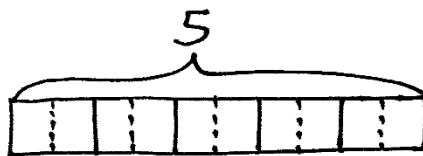


$$2 \text{ units} = 5$$

$$1 \text{ unit} = 5 \div 2$$

$$= \frac{5}{2} = 2\frac{1}{2}$$

$$5 \div \frac{1}{2} = 10$$



d. Could either of the problems also be solved by using  $\frac{1}{2} \times 5$ ? If so, which one(s)? Explain your thinking.

$$5 \div 2 = 5 \times \frac{1}{2}$$

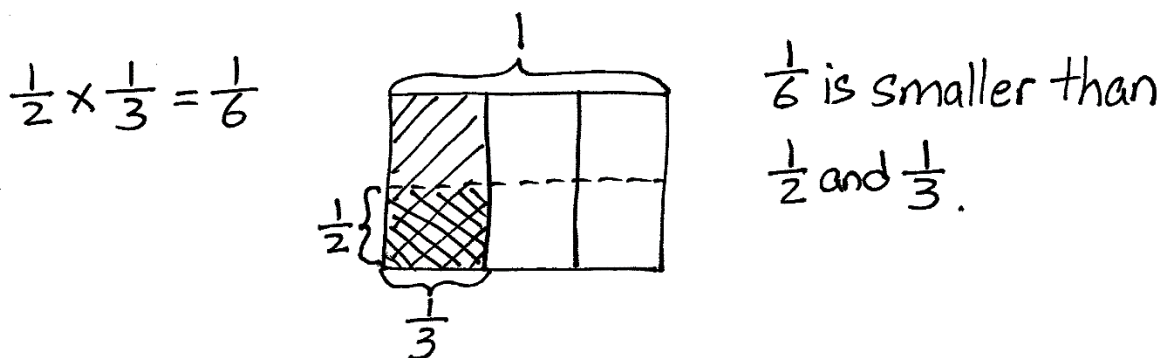
Dividing by 2 is the same as taking  $\frac{1}{2}$  of something, which means multiplying.

$\frac{1}{2} \times 5$  is the same as  $5 \times \frac{1}{2}$ .

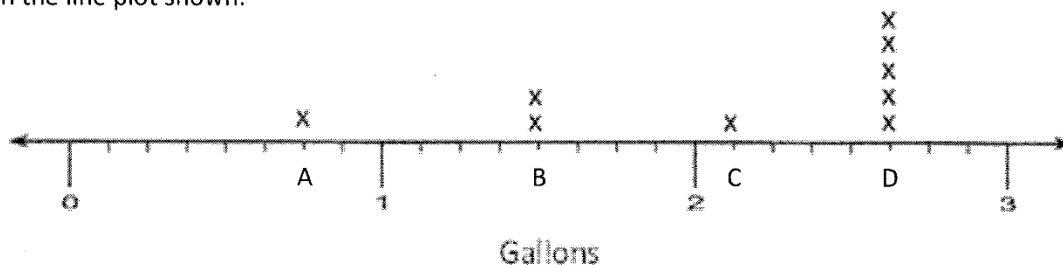
6. Jackson claims that multiplication always makes a number bigger. He gave the following examples:

- If I take 6, and I multiply it by 4, I get 24, which is bigger than 6.
- If I take  $\frac{1}{4}$ , and I multiply it by 2 (whole number), I get  $\frac{2}{4}$ , or  $\frac{1}{2}$  which is bigger than  $\frac{1}{4}$ .

Jackson's reasoning is incorrect. Give an example that proves he is wrong, and explain his mistake using pictures, words, or numbers.



7. Jill collected honey from 9 different beehives, and recorded the amount collected, in gallons, from each hive in the line plot shown:



- a. She wants to write the value of each point marked on the number line above (Points A–D) in terms of the largest possible whole number of gallons, quarts, and pints. Use the line plot above to fill in the blanks with the correct conversions. (The first one is done for you.)

A. 0 gal 3 qt 0 pt

B. 1 gal 2 qt 0 pt

C. 2 gal 0 qt 1 pt

D. 2 gal 2 qt 1 pt

- b. Find the total amount of honey collected from the five hives that produced the most honey.

$$1 \text{ unit} = 2\frac{5}{8} \text{ gallons}$$

$$\begin{aligned} 5 \text{ units} &= 5 \times 2\frac{5}{8} \text{ gallons} \\ &= (5 \times 2) + (5 \times \frac{5}{8}) \text{ gallons} \\ &= 10 + \frac{25}{8} \text{ gallons} \\ &= 10 + 3\frac{1}{8} \text{ gallons} \\ &= 13\frac{1}{8} \text{ gallons} \end{aligned}$$

$13\frac{1}{8}$  gallons or 13 gallons and 1 pint were collected from the five hives that produced the most honey.

- c. Jill collected a total of 19 gallons of honey. If she distributes all of the honey equally between 9 jars, how much honey will be in each jar?

$$19 \div 9 = \frac{19}{9} = 2\frac{1}{9}$$

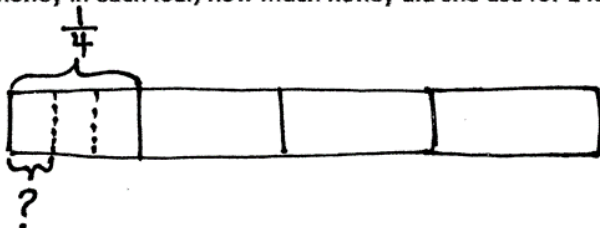
There will be  $2\frac{1}{9}$  gallons of honey in each jar.

- d. Jill used  $\frac{3}{4}$  of a jar for baking. How much honey did she use baking?

$$\begin{aligned} &\frac{3}{4} \text{ of } 2\frac{1}{9} \text{ gallons} \\ &= \frac{3}{4} \times \frac{19}{9} \text{ gallons} \\ &= \frac{\cancel{3} \times 19}{4 \times \cancel{9}_3} \text{ gallons} \\ &= \frac{19}{12} = 1\frac{7}{12} \text{ gallons} \end{aligned}$$

She used  $1\frac{7}{12}$  gallons of honey for baking.

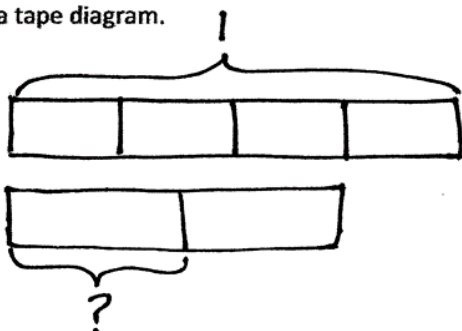
- e. Jill's mom used  $\frac{1}{4}$  of a gallon of honey to bake 3 loaves of bread. If she used an equal amount of honey in each loaf, how much honey did she use for 1 loaf?



$$\frac{1}{4} \div 3 = \frac{1}{4} \times \frac{1}{3} = \frac{1}{12}$$

She used  $\frac{1}{12}$  of a gallon of honey for 1 loaf.

- f. Jill's mom stored some of the honey in a container that held  $\frac{3}{4}$  of a gallon. She used half of this amount to sweeten tea. How much honey, in cups, was used in the tea? Write an equation and draw a tape diagram.



$$\begin{aligned} \frac{1}{2} \times \frac{3}{4} \text{ gallon} &= \frac{3}{8} \text{ gallon} \\ \frac{3}{8} \text{ gallon} &= \frac{3}{8} \times 1 \text{ gallon} \\ &= \frac{3}{8} \times 16 \text{ cups} \\ &= \frac{3 \times 16}{8} \text{ cups} \\ &= 6 \text{ cups} \end{aligned}$$

She used 6 cups of honey in the tea.

- g. Jill uses some of her honey to make lotion. If each bottle of lotion requires  $\frac{1}{4}$  gallon, and she uses a total of 3 gallons, how many bottles of lotion does she make?

$$3 \div \frac{1}{4} = 3 \times 4 = 12$$

She makes 12 bottles of lotion.