ANSWER KEY

MODU

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GRADE 5 • MODULE 4

Multiplication and Division of Fractions and Decimal Fractions

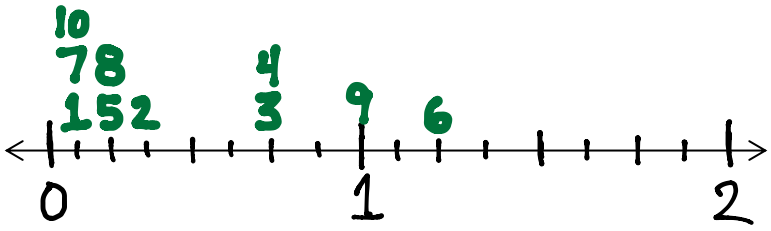
ANSWER KEY

For video tutorials on many of these problems, please visit http://EMBARC.online

If you find a mistake, please let me know at dhabecker@gmail.com

Name _____ Date _____

1. A meteorologist set up rain gauges at various locations around a city, and recorded the rainfall amounts in the table below. Use the data in the table to create a line plot using $\frac{1}{8}$ inches.



Location	Rainfall Amount (inches)
1	$\frac{1}{8}$
2	$\frac{3}{8}$
3	$\frac{3}{4}$
4	$\frac{3}{4}$
5	$\frac{1}{4}$
6	$1\frac{1}{4}$
7	$\frac{1}{8}$
8	$\frac{1}{4}$
9	1
10	$\frac{1}{8}$

a. Which location received the most rainfall?

Location 6

b. Which location received the least rainfall?

Locations 1, 7, and 10.

c. Which rainfall measurement was the most frequent?

$\frac{1}{8}$ inches was most frequent.

d. What is the total rainfall in inches?

$\frac{1}{8}+\frac{3}{8}+\frac{3}{4}+\frac{3}{4}+\frac{1}{4}+1\frac{1}{4}+\frac{1}{8}+\frac{1}{4}+1+\frac{1}{8}$

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

$2 + 3$

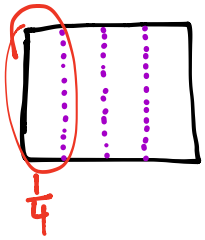
5

5 inches total rainfall.

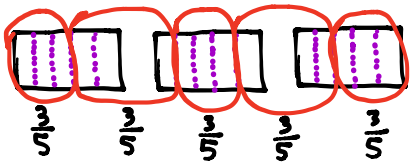
Name _____ Date _____

1. Draw a picture to show the division. Express your answer as a fraction.

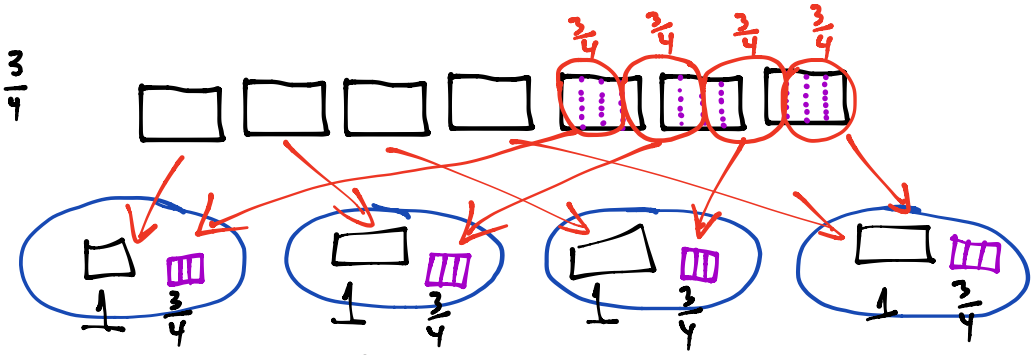
a. $1 \div 4 = \frac{1}{4}$



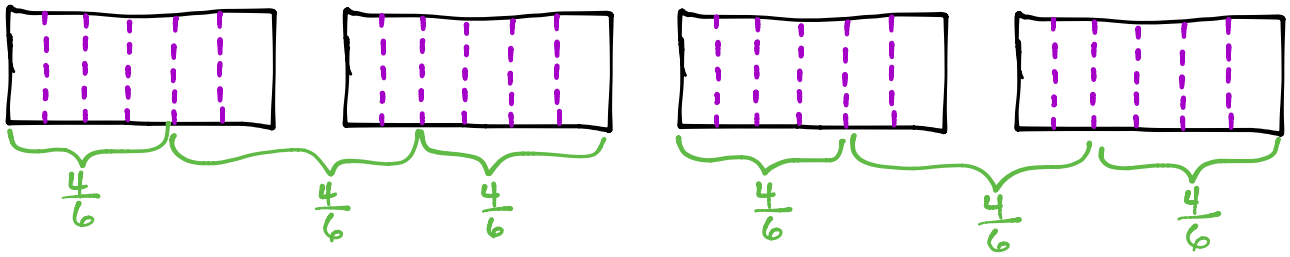
b. $3 \div 5 = \frac{3}{5}$



c. $7 \div 4 = \frac{7}{4} = 1\frac{3}{4}$



2. Using a picture, show how six people could share four sandwiches. Then write an equation and solve.



$4 \div 6 = \frac{4}{6}$

Cut each sandwich into 6 pieces. Each person will get four pieces.

3. Fill in the blanks to make true number sentences.

a. $2 \div 7 = \frac{2}{7}$

b. $39 \div 5 = \frac{39}{5}$

c. $13 \div 3 = \frac{13}{3}$

d. $\frac{9}{5} =$ 9 ÷ 5

e. $\frac{19}{28} =$ 19 ÷ 28

f. $1\frac{3}{5} =$ 8 ÷ 5

Name _____ Date _____

1. Fill in the chart. The first one is done for you.

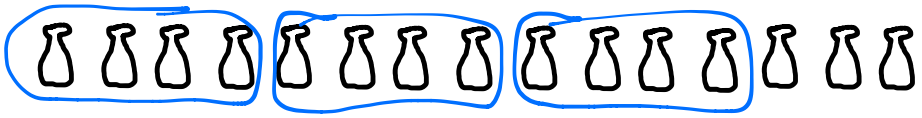
Division Expression	Unit Forms	Improper Fractions	Mixed Numbers	Standard Algorithm (Write your answer in whole numbers and fractional units, then check.)
a. $4 \div 3$	12 thirds ÷ 3 = 4 thirds	$\frac{4}{3}$	$1\frac{1}{3}$	$3\overline{)4}$ → $1\frac{1}{3}$, -3, 1 Check $3 \times 1\frac{1}{3} = 1\frac{1}{3} + 1\frac{1}{3} + 1\frac{1}{3}$ $= 3 + \frac{3}{3}$ $= 3 + 1$ $= 4$
b. $7 \div 5$	35 fifths ÷ 5 = 7 fifths	$\frac{7}{5}$	$1\frac{2}{5}$	$5\overline{)7}$ → $1\frac{2}{5}$, -5, 2 Check: $5 \times 1\frac{2}{5} =$ $= 1\frac{2}{5} + 1\frac{2}{5} + 1\frac{2}{5} + 1\frac{2}{5} + 1\frac{2}{5}$ $= 5 + \frac{10}{5}$ $= 5 + 2 = 7$
c. $7 \div 2$	14 halves ÷ 2 = 7 halves	$\frac{7}{2}$	$3\frac{1}{2}$	$2\overline{)7}$ → $3\frac{1}{2}$, -6, 1 Check $2 \times 3\frac{1}{2} = 3\frac{1}{2} + 3\frac{1}{2}$ $= 6 + \frac{2}{2}$ $= 6 + 1$ $= 7$
d. $7 \div 4$	28 fourths ÷ 4 = 7 fourths	$\frac{7}{4}$	$1\frac{3}{4}$	$4\overline{)7}$ → $1\frac{3}{4}$, -4, 3 Check: $4 \times 1\frac{3}{4} = 1\frac{3}{4} + 1\frac{3}{4} + 1\frac{3}{4} + 1\frac{3}{4}$ $= 4 + \frac{12}{4}$ $= 4 + 3$ $= 7$

2. A coffee shop uses 4 liters of milk every day.

   a. If they have 15 liters of milk in the refrigerator, after how many days will they need to purchase more? Explain how you know.

$$4\overline{)15} \quad 3\tfrac{3}{4}$$
$$-12$$
$$3$$

After 3 days they will need to purchase more milk because at that point they will only have 3 liters left.



   b. If they only use half as much milk each day, after how many days will they need to purchase more?

$$2\overline{)15} \quad 7\tfrac{1}{2}$$
$$-14$$
$$1$$

they will need to purchase more milk after 7 days.

3. Polly buys 14 cupcakes for a party. The bakery puts them into boxes that hold 4 cupcakes each.

   a. How many boxes will be needed for Polly to bring all the cupcakes to the party? Explain how you know.

$$4\overline{)14} \quad 3\tfrac{2}{4}$$
$$-12$$
$$2$$

Polly will need 4 boxes. Three boxes will be completely full. The last box will only have 2 cupcakes in it.

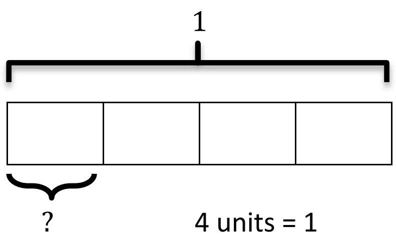
   b. If the bakery completely fills as many boxes as possible, what fraction of the last box is empty? How many more cupcakes are needed to fill this box?

$\frac{2}{4}$ (or $\frac{1}{2}$) of the last box will be empty. 2 more cupcakes are needed to fill the box.

Name ______________________________ Date ________________

1. Draw a tape diagram to solve. Express your answer as a fraction. Show the addition sentence to support your answer. The first one is done for you.

a. $1 \div 4 = \frac{1}{4}$



4 units = 1

1 unit = 1 ÷ 4

$= \frac{1}{4}$

$4 \overline{)\,1\,}$ with quotient $0\ \frac{1}{4}$; $1 - 0 = 1$

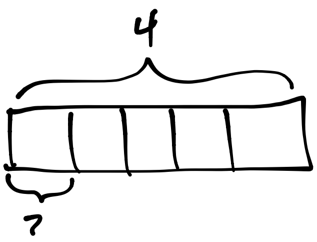
Check: $4 \times \frac{1}{4}$

$= \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$

$= \frac{4}{4}$

$= 1$

b. $4 \div 5 =$ ___



5 units = 4

1 unit = 4 ÷ 5

$= \frac{4}{5}$

$5 \overline{)\,4\,}$ with quotient $0\ \frac{4}{5}$; $4 - 0 = 4$

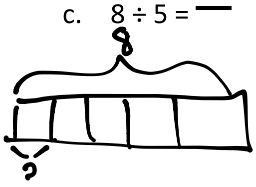
Check:

$5 \times \frac{4}{5} = \frac{4}{5} + \frac{4}{5} + \frac{4}{5} + \frac{4}{5} + \frac{4}{5}$

$= \frac{20}{5}$

$= 4$

c. $8 \div 5 =$ ___



5 units = 8

1 unit = 8 ÷ 5

$= \frac{8}{5}$

$5 \overline{)\,8\,}$ with quotient $1\ \frac{3}{5}$; $8 - 5 = 3$

check

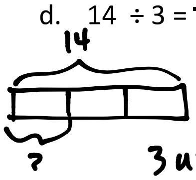
$5 \times 1\frac{3}{5} = 1\frac{3}{5} + 1\frac{3}{5} + 1\frac{3}{5} + 1\frac{3}{5} + 1\frac{3}{5}$

$= 5 + \frac{15}{5}$

$= 5 + 3$

$= 8$

d. $14 \div 3 =$ ___



3 units = 14

1 unit = $\frac{14}{3}$

$3 \overline{)\,14\,}$ with quotient $4\frac{2}{3}$; $14 - 12 = 2$

Check

$3 \times 4\frac{2}{3} = 4\frac{2}{3} + 4\frac{2}{3} + 4\frac{2}{3}$

$= 12 + \frac{6}{3}$

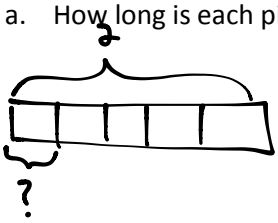
$= 12 + 2$

$= 14$

2. Fill in the chart. The first one is done for you.

Division Expression	Fraction	Between which two whole numbers is your answer?	Standard Algorithm
a. $16 \div 5$	$\frac{16}{5}$	3 and 4	$3\ \frac{1}{5}$; $5\overline{)16}$; -15; 1
b. $3 \div 4$	$\frac{3}{4}$	0 and 1	$0\ \frac{3}{4}$; $4\overline{)3}$; -0; 3
c. $7 \div 2$	$\frac{7}{2}$	3 and 4	$3\ \frac{1}{2}$; $2\overline{)7}$; -6; 1
d. $81 \div 90$	$\frac{81}{90}$	0 and 1	$0\ \frac{81}{90}$; $90\overline{)81}$; -0; 81

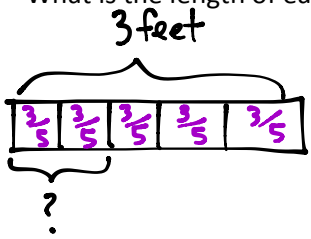
3. Jackie cut a 2-yard spool into 5 equal lengths of ribbon.
   a. How long is each piece of ribbon? Draw a tape diagram to show your thinking.



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

Each piece is $\frac{2}{5}$ yard long.

   b. What is the length of each ribbon in feet? Draw a tape diagram to show your thinking.

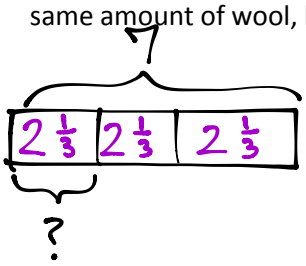


$3 \div 5 = \frac{3}{5}$

One unit is $\frac{3}{5}$ of a foot. So, two units is $\frac{6}{5}$ of a foot.

$\frac{6}{5} = 1\frac{1}{5}$ ft.

4. Baa Baa the black sheep had 7 pounds of wool. If he separated the wool into 3 bags, each holding the same amount of wool, how much wool would be in 2 bags?



$7 \div 3 = \frac{7}{3} = 2\frac{1}{3}$

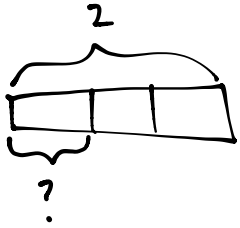
$3\overline{)7}$ $2\frac{1}{3}$, -6, 1

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

$= 4\frac{2}{3}$

$4\frac{2}{3}$ pounds of wool

5. An adult sweater is made from 2 pounds of wool. This is 3 times as much wool as it takes to make a baby sweater. How much wool does it take to make a baby sweater? Use a tape diagram to solve.



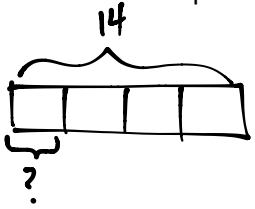
$2 \div 3 = \frac{2}{3}$

A baby sweater requires $\frac{2}{3}$ pound of wool.

Name _____ Date _____

1. When someone donated 14 gallons of paint to Rosendale Elementary School, the fifth grade decided to use it to paint murals. They split the gallons equally among the four classes.

   a. How much paint did each class have to paint their mural?

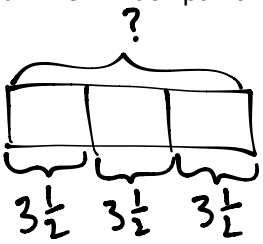


$14 \div 4 = \frac{14}{4} = 3\frac{2}{4} = 3\frac{1}{2}$

$4\overline{)14}$ $3\frac{2}{4} = 3\frac{1}{2}$
-12
2

Each class had $3\frac{1}{2}$ gallons of paint.

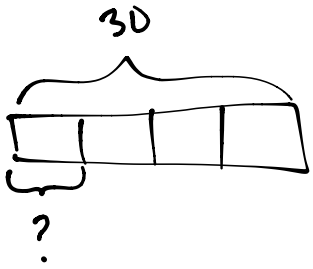
   b. How much paint will three classes use? Show your thinking using words, numbers, or pictures.



$3 \times 3\frac{1}{2} = 3\frac{1}{2} + 3\frac{1}{2} + 3\frac{1}{2}$
$= 9 + \frac{3}{2}$
$= 9 + 1\frac{1}{2} = 10\frac{1}{2}$

Three classes will use $10\frac{1}{2}$ gallons of paint.

   c. If 4 students share a 30 square foot wall equally, how many square feet of the wall will be painted by each student?



$30 \div 4 = \frac{30}{4} = 7\frac{2}{4} = 7\frac{1}{2}$

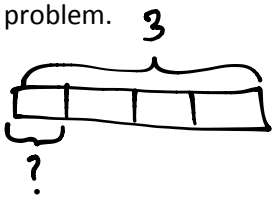
$4\overline{)30}$ $7\frac{2}{4} = 7\frac{1}{2}$
-28
2

Each student will paint $7\frac{1}{2}$ square feet of the wall.

   d. What fraction of the wall will each student paint?

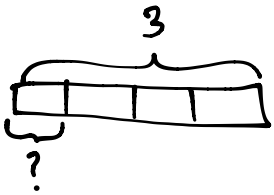
Each student painted $\frac{1}{4}$ of the wall.

2. Craig bought a 3-foot long baguette, and then made 4 equally sized sandwiches with it.
   a. What portion of the baguette was used for each sandwich? Draw a visual model to help you solve this problem.



Each sandwich uses $\frac{1}{4}$ of the baguette.

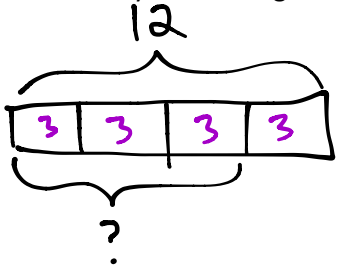
   b. How long, in feet, is one of Craig's sandwiches?



$3 \div 4 = \frac{3}{4}$

One sandwich is $\frac{3}{4}$ foot long.

   c. How many inches long is one of Craig's sandwiches?



$12 \div 4 = 3$

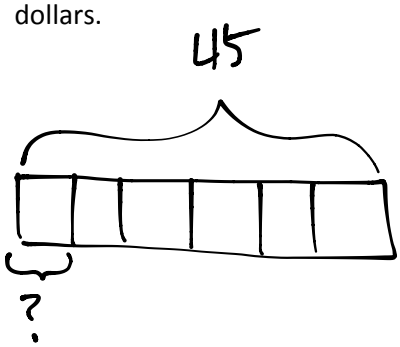
$3 \times 3 = 9$

One unit is 3 inches.

3 units equals 9 inches.

1 sandwich is 9 inches long.

3. Scott has 6 days to save enough money for a $45 concert ticket. If he saves the same amount each day, what is the minimum amount he must save each day in order to reach his goal? Express your answer in dollars.



$45 \div 6 = \frac{45}{6} = 7\frac{3}{6} = 7\frac{1}{2}$

$$\begin{array}{r} 7\frac{3}{6} = 7\frac{1}{2} \\ 6\overline{)45} \\ -42 \\ \hline 3 \end{array}$$

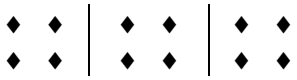
Scott must save $\$7\frac{1}{2}$ each day.

$\$7\frac{1}{2} = \$7.50$

Name _____ Date _____

1. Find the value of each of the following.

a.

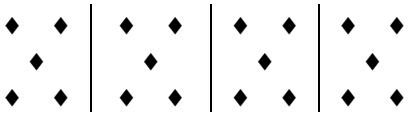


$\frac{1}{3}$ of 12 = 4

$\frac{2}{3}$ of 12 = 8

$\frac{3}{3}$ of 12 = 12

b.



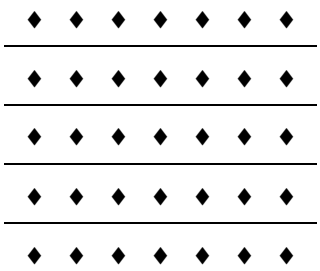
$\frac{1}{4}$ of 20 = 5

$\frac{2}{4}$ of 20 = 10

$\frac{3}{4}$ of 20 = 15

$\frac{4}{4}$ of 20 = 20

c.



$\frac{1}{5}$ of 35 = 7

$\frac{2}{5}$ of 35 = 14

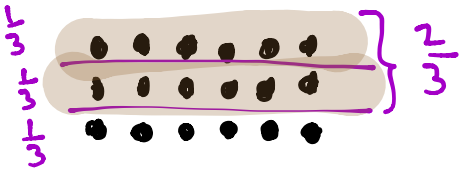
$\frac{3}{5}$ of 35 = 21

$\frac{4}{5}$ of 35 = 28

$\frac{5}{5}$ of 35 = 35

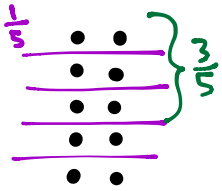
$\frac{6}{5}$ of 35 = 42

2. Find $\frac{2}{3}$ of 18. Draw a set and shade to show your thinking.



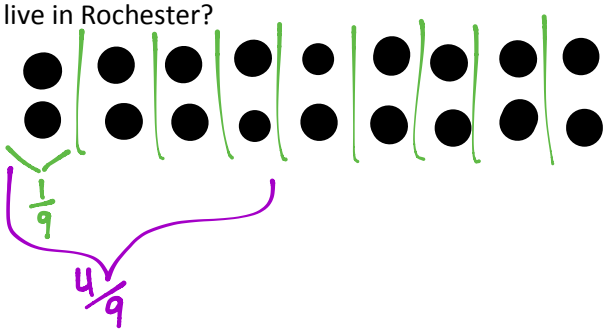
$\frac{2}{3}$ is 12 dots

3. How does knowing $\frac{1}{5}$ of 10 help you find $\frac{3}{5}$ of 10? Draw a picture to explain your thinking.



Take the answer for $\frac{1}{5}$ and multiply by 3 to find the answer for $\frac{3}{5}$.

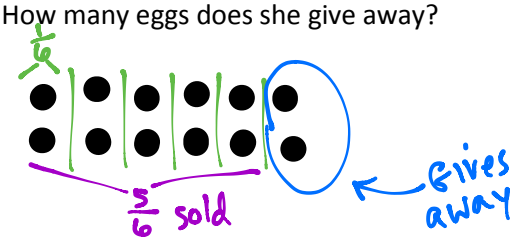
4. Sara just turned 18 years old. She spent $\frac{4}{9}$ of her life living in Rochester, NY. For how many years did Sara live in Rochester?



$\frac{4}{9}$ of 18 is 8, so Sara lived in Rochester for 8 years.

5. A farmer collects 12 dozen eggs from her chickens. She sells $\frac{5}{6}$ of the eggs at the farmers' market and gives the rest to friends and neighbors.

a. How many eggs does she give away?



Each dot represents a dozen eggs.

$2 \times 12 = 24$

She gives away 24 eggs.

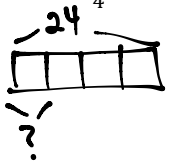
b. If she sells each dozen for $4.50, how much will she earn from the eggs she sells?

$10 \times 4.50 = 45$ She will earn $45.

Name _____ Date _____

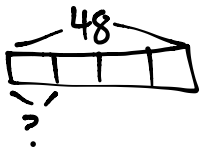
1. Solve using a tape diagram.

a. $\frac{1}{4}$ of 24 = 6



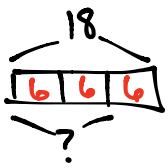
4 units = 24
1 unit = 24 ÷ 4
= 6

b. $\frac{1}{4}$ of 48 = 12



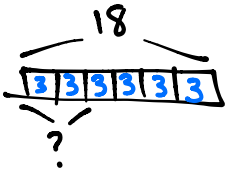
4 units = 48
1 unit = 48 ÷ 4
= 12

c. $\frac{2}{3} \times 18$ = 12



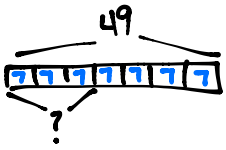
3 units = 18
1 unit = 18 ÷ 3
= 6

d. $\frac{2}{6} \times 18$ = 6



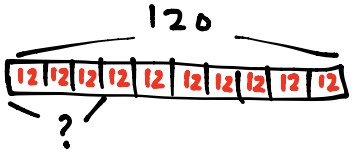
6 units = 18
1 unit = 18 ÷ 6
= 3

e. $\frac{3}{7} \times 49$ = 21



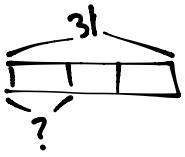
7 units = 49
1 unit = 49 ÷ 7
= 7

f. $\frac{3}{10} \times 120$ = 36



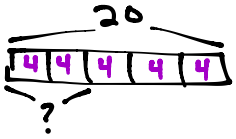
10 units = 120
1 unit = 120 ÷ 10
= 12

g. $\frac{1}{3} \times 31$ = $10\frac{1}{3}$



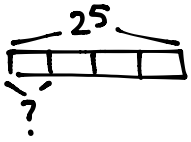
3 units = 31
1 unit = 31 ÷ 3
= $\frac{31}{3}$ = $10\frac{1}{3}$

h. $\frac{2}{5} \times 20$ = 8



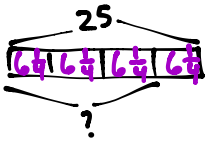
5 units = 20
1 unit = 20 ÷ 5
= 4

i. $\frac{1}{4} \times 25$ = $6\frac{1}{4}$



4 units = 25
1 unit = 25 ÷ 4
= $\frac{25}{4}$ = $6\frac{1}{4}$

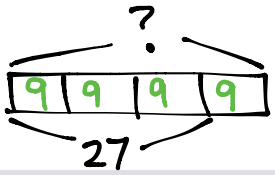
j. $\frac{3}{4} \times 25$ = $18\frac{3}{4}$



4 units = 25
1 unit = 25 ÷ 4
= $\frac{25}{4}$ = $6\frac{1}{4}$

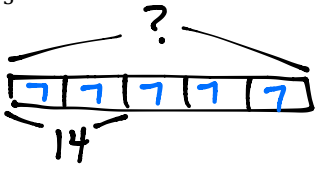
3 units = $18\frac{3}{4}$

k. $\frac{3}{4}$ of a number is 27. What's the number?



3 units = 27
1 unit = 9
? = 36

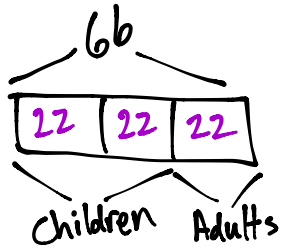
l. $\frac{2}{5}$ of a number is 14. What's the number?



2 units = 14
1 unit = 7
? = 35

2. Solve using tape diagrams.

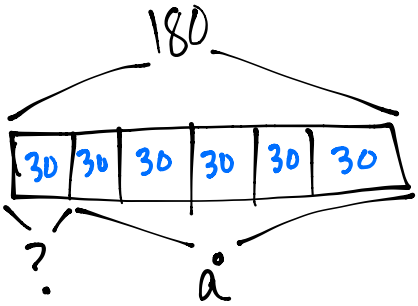
a. A skating rink sold 66 tickets. Of these, $\frac{2}{3}$ were children's tickets, and the rest were adult tickets. How many adult tickets were sold?



3 units = 66
1 unit = 22

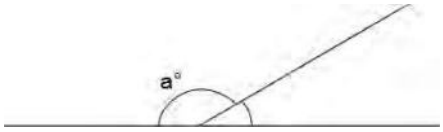
22 adult tickets were sold.

b. A straight angle is split into two smaller angles as shown. The smaller angle's measure is $\frac{1}{6}$ that of a straight angle. What is the value of angle a?

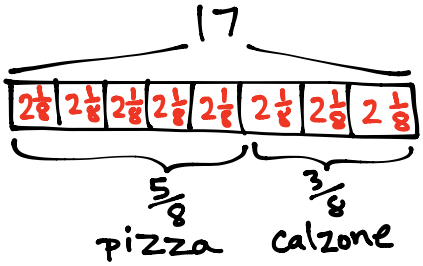


6 units = 180
1 unit = 30
5 × 30 = 150

Angle A is 150°



c. Annabel and Eric made 17 ounces of pizza dough. They used $\frac{5}{8}$ of the dough to make a pizza and used the rest to make calzones. What is the difference between the amount of dough they used to make pizza and the amount of dough they used to make calzones?



1 unit = 17 ÷ 8

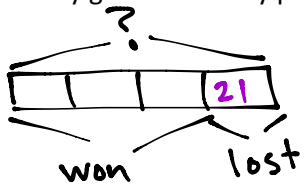
$$8\overline{)17}\quad 2\tfrac{1}{8}$$
$$-16$$
$$1$$

$4\frac{2}{8} = 4\frac{1}{4}$ ounces

pizza: $5 \times 2\frac{1}{8} = 10\frac{5}{8}$
calzone: $3 \times 2\frac{1}{8} = 6\frac{3}{8}$

$4\frac{2}{8}$ ounces more dough for pizza.

d. The New York Rangers hockey team won $\frac{3}{4}$ of their games last season. If they lost 21 games, how many games did they play in the entire season?



1 unit = 21
4 units = 21 × 4
= 84

84 games

Name _____ Date _____

1. Rewrite the following expressions as shown in the example.

Example: $\frac{2}{3}+\frac{2}{3}+\frac{2}{3}+\frac{2}{3}=\frac{4\times 2}{3}=\frac{8}{3}$

a. $\frac{5}{3}+\frac{5}{3}+\frac{5}{3}$ $= \frac{3\times 5}{3}=\frac{15}{3}=5$

b. $\frac{13}{5}+\frac{13}{5}$ $= \frac{2\times 13}{5}=\frac{26}{5}$

c. $\frac{9}{4}+\frac{9}{4}+\frac{9}{4}$ $= \frac{3\times 9}{4}=\frac{27}{4}$

2. Solve each problem in two different ways as modeled in the example.

Example: $\frac{2}{3}\times 6=\frac{2\times 6}{3}=\frac{12}{3}=4$

b. $\frac{2}{3}\times 6=\frac{2\times \cancel{6}^{2}}{\cancel{3}_{1}}=4$

a. $\frac{3}{4}\times 16 = \frac{3\times 16}{4}=\frac{48}{4}=12$

$\frac{3}{4}\times 16 = \frac{3\times \cancel{16}^{4}}{\cancel{4}_{1}}=\frac{12}{1}=12$

b. $\frac{4}{3}\times 12 = \frac{4\times 12}{3}=\frac{48}{3}=16$

$\frac{4}{3}\times 12 = \frac{4\times \cancel{12}^{4}}{\cancel{3}_{1}}=\frac{16}{1}=16$

c. $40\times\frac{11}{10} = \frac{40\times 11}{10}=\frac{440}{10}=44$

$40\times\frac{11}{10} = \frac{\cancel{40}^{4}\times 11}{\cancel{10}_{1}}=\frac{44}{1}=44$

d. $\frac{7}{6}\times 36 = \frac{7\times 36}{6}=\frac{252}{6}=42$

$\frac{7}{6}\times 36 = \frac{7\times \cancel{36}^{6}}{\cancel{6}_{1}}=\frac{42}{1}=42$

e. $24\times\frac{5}{8} = \frac{24\times 5}{8}=\frac{120}{8}=15$

$24\times\frac{5}{8} = \frac{\cancel{24}^{3}\times 5}{\cancel{8}_{1}}=\frac{15}{1}=15$

f. $18 \times \frac{5}{12} = \frac{18 \times 5}{12} = \frac{90}{12} = 7\frac{6}{12} = 7\frac{1}{2}$ $18 \times \frac{5}{12} = \frac{\overset{3}{\cancel{18}} \times 5}{\underset{2}{\cancel{12}}} = \frac{15}{2} = 7\frac{1}{2}$

g. $\frac{10}{9} \times 21 = \frac{10 \times 21}{9} = \frac{210}{9} = 23\frac{3}{9} = 23\frac{1}{3}$ $\frac{10}{9} \times 21 = \frac{10 \times \overset{7}{\cancel{21}}}{\underset{3}{\cancel{9}}} = \frac{70}{3} = 23\frac{1}{3}$

3. Solve each problem any way you choose.

a. $\frac{1}{3} \times 60 = \frac{1 \times 60}{3} = \frac{60}{3} = 20$ $\frac{1}{3}$ minute = 20 seconds

b. $\frac{4}{5} \times 60 = \frac{4 \times \overset{12}{\cancel{60}}}{\underset{1}{\cancel{5}}} = \frac{48}{1} = 48$ $\frac{4}{5}$ hour = 48 minutes

c. $\frac{7}{10} \times 1000 = \frac{7 \times \overset{100}{\cancel{1000}}}{\underset{1}{\cancel{10}}} = \frac{700}{1} = 700$ $\frac{7}{10}$ kilogram = 700 grams

d. $\frac{3}{5} \times 100 = \frac{3 \times \overset{20}{\cancel{100}}}{\underset{1}{\cancel{5}}} = \frac{60}{1} = 60$ $\frac{3}{5}$ meter = 60 centimeters

Name _____ Date _____

1. Convert. Show your work using a tape diagram or an equation. The first one is done for you.

a. $\frac{1}{4}$ yard = 9 inches

$\frac{1}{4}$ yd = $\frac{1}{4}$ × 1 yard

= $\frac{1}{4}$ × 36 inches

= $\frac{36}{4}$ inches

= 9 inches

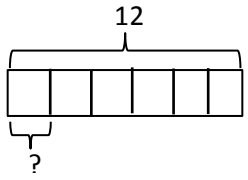
b. $\frac{1}{6}$ foot = 2 inches

$\frac{1}{6}$ foot = $\frac{1}{6}$ × 1 foot

= $\frac{1}{6}$ × 12 inches

= $\frac{12}{6}$ in

= 2 in



c. $\frac{3}{4}$ year = 9 months

$\frac{3}{4}$ year = $\frac{3}{4}$ × 12 months

= $\frac{36}{4}$ months

= 9 months

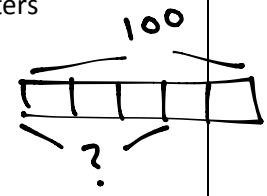
d. $\frac{3}{5}$ meter = 60 centimeters

$\frac{3}{5}$ m = $\frac{3}{5}$ × 100 cm

= $\frac{3 \times 100^{20}}{1 \quad 5}$ cm

= $\frac{60}{1}$ cm

= 60cm



e. $\frac{5}{12}$ hour = 25 minutes

$\frac{5}{12}$ hr = $\frac{5}{12}$ × 60 min

= $\frac{5 \times 60^{5}}{1 \quad 12}$ min

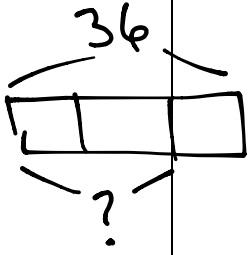
= 25 min

f. $\frac{2}{3}$ yard = 24 inches

$\frac{2}{3}$ yd = $\frac{2}{3}$ × 36 in

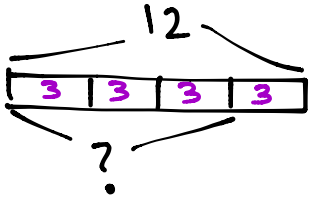
= $\frac{2 \times 36^{12}}{1 \quad 3}$ in

= 24 in



2. Michelle measured the length of her forearm. It was $\frac{3}{4}$ of a foot. How long is her forearm in inches?

$\frac{3}{4}$ ft = 9 inches



3. At the market, Ms. Winn bought $\frac{3}{4}$ lb of grapes and $\frac{5}{8}$ lb of cherries.

   a. How many ounces of grapes did Ms. Winn buy?

   $\frac{3}{4}$ lb = 12 ounces

   $\frac{3}{4}$ lb = $\frac{3}{4} \times 16$ oz
   = $\frac{3 \times 16}{4}$ oz
   = 12 oz

   b. How many ounces of cherries did Ms. Winn buy?

   $\frac{5}{8}$ lb = 10 ounces

   $\frac{5}{8}$ lb = $\frac{5}{8} \times 16$ ounces
   = $\frac{5 \times 16}{8}$ oz
   = 10 oz

   c. How many more ounces of grapes than cherries did Ms. Winn buy?

   12 − 10 = 2

   2 ounces more of grapes

   d. If Mr. Phillips bought $1\frac{3}{4}$ pounds of raspberries, who bought more fruit, Ms. Winn or Mr. Phillips? How many ounces more?

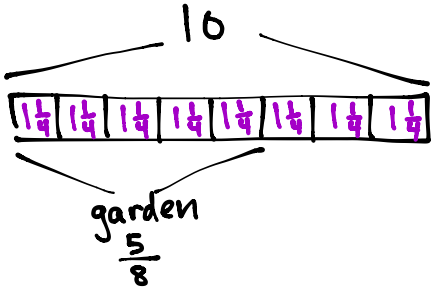
   Ms W: 12 + 10 = 22 ounces

   $\frac{3}{4}$ lb = 12 ounces

   Mr P: 16 + 12 = 28 ounces

   Mr P bought 6 ounces more.

4. A gardener has 10 pounds of soil. He used $\frac{5}{8}$ of the soil for his garden. How many pounds of soil did he use in the garden? How many pounds did he have left?



1 unit = 10 ÷ 8 = $\frac{10}{8}$ = $1\frac{2}{8}$ = $1\frac{1}{4}$

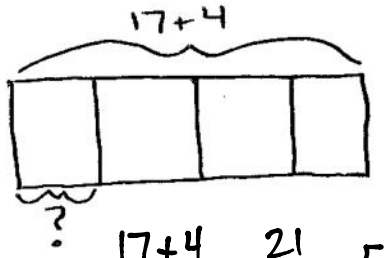
garden: $5 \times 1\frac{1}{4} = 1\frac{1}{4} + 1\frac{1}{4} + 1\frac{1}{4} + 1\frac{1}{4} + 1\frac{1}{4}$
= $5 + \frac{5}{4}$
= $5 + 1\frac{1}{4}$
= $6\frac{1}{4}$

$6\frac{1}{4}$ pounds used for garden.
$3\frac{3}{4}$ pounds left over.

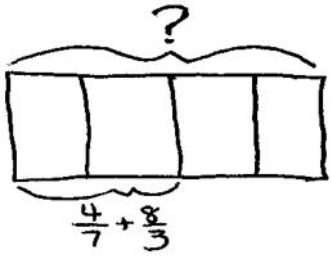
left: $3 \times 1\frac{1}{4} = 1\frac{1}{4} + 1\frac{1}{4} + 1\frac{1}{4}$
= $3 + \frac{3}{4}$
= $3\frac{3}{4}$

Name _____ Date _____

1. Write expressions to match the diagrams. Then evaluate.



$\frac{17+4}{4} = \frac{21}{4} = 5\frac{1}{4}$



$\left(\frac{4}{7}+\frac{8}{3}\right)\times 2$

$\left(\frac{12}{21}+\frac{56}{21}\right)\times 2$

$= \frac{68}{21}\times 2$

$= \frac{136}{21} = 6\frac{10}{21}$

2. Circle the expression(s) that give the same product as $6 \times 1\frac{3}{8}$. Explain how you know.

$6 \times \frac{3}{8}$

~~$8 \div (3 \times 6)$~~

$3 \div 8 \times 6$ same as $\frac{3}{8} \times 6$

$(6 \times 3) \div 8$ Associative Property

~~$(8 \div 6) \times 3$~~

~~$6 \times \frac{8}{3}$~~

$\frac{3}{8} \times 6$ Commutative Property

3. Write an expression to match, then evaluate.

a. $\frac{1}{8}$ the sum of 23 and 17.

$\frac{1}{8} \times (23+17) = \frac{1}{8} \times 40 = \frac{40}{8} = 5$

b. Subtract 4 from $\frac{1}{6}$ of 42.

$\left(\frac{1}{6} \times 42\right) - 4 = \left(\frac{42}{6}\right) - 4 = 7 - 4 = 3$

c. 7 times as much as the sum of $\frac{1}{3}$ and $\frac{4}{5}$.

$7 \times \left(\frac{1}{3}+\frac{4}{5}\right) = 7 \times \frac{17}{15} = 7 \times 1\frac{2}{15}$

$= 7\frac{14}{15}$

d. $\frac{2}{3}$ of the product of $\frac{3}{8}$ and 16.

$\frac{2}{3} \times \left(\frac{3}{8} \times 16\right) = \frac{2}{3} \times \frac{48}{8} = \frac{2}{3} \times 6 = 4$

e. 7 copies of the sum of 8 fifths and 4.

$7 \times \left(\frac{8}{5}+4\right) = 7 \times \left(1\frac{3}{5}+4\right)$

$= 7 \times 5\frac{3}{5}$

$= 35 + \frac{21}{5}$

$= 35 + 4\frac{1}{5} = 39\frac{1}{5}$

f. 15 times as much as 1 fifth of 12.

$15 \times \left(\frac{1}{5} \times 12\right) = \left(15 \times \frac{1}{5}\right) \times 12$

$= 3 \times 12$

$= 36$

4. Use <, >, or = to make true number sentences without calculating. Explain your thinking.

a. $\frac{2}{3} \times (9 + 12)$ > $15 \times \frac{2}{3}$

$\frac{2}{3}$ of 21 $\frac{2}{3}$ of 15

b. $\left(3 \times \frac{5}{4}\right) \times \frac{3}{5}$ > $\left(3 \times \frac{5}{4}\right) \times \frac{3}{8}$

$\frac{15}{20}$ of 3 $\frac{15}{32}$ of 3

because $\frac{15}{20}$ is bigger than $\frac{15}{32}$

c. $6 \times (2 + \frac{32}{16})$ > $(6 \times 2) + \frac{32}{16}$

6 copies of 2 and 6 copies of $\frac{32}{16}$

6 copies of 2 and 1 copy of $\frac{32}{16}$

5. Fantine bought flour for her bakery each month and recorded the amount in the table to the right. For (a–c) write an expression that records the calculation described. Then solve to find the missing data in the table.

a. She bought $\frac{3}{4}$ of January's total in August.

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

b. She bought $\frac{7}{8}$ as much in April as she did in October and July combined.

$\frac{7}{8} \times \left(1\frac{1}{4} + \frac{3}{4}\right) = \frac{7}{8} \times 2 = \frac{7 \times 2}{4 \times 8}$

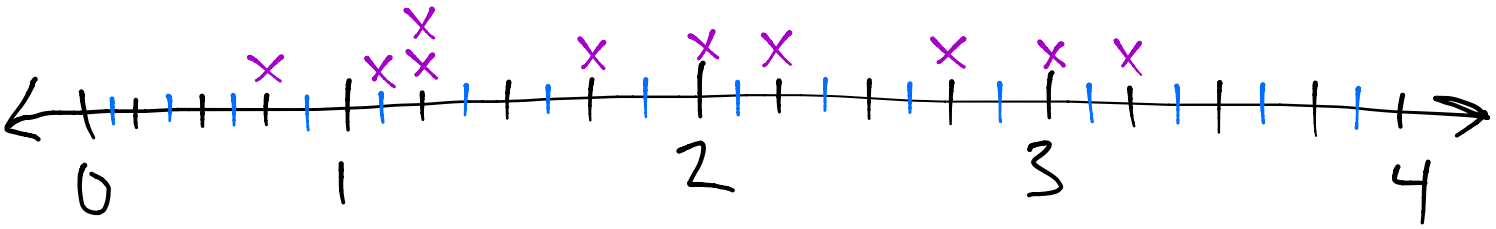
$= \frac{7}{4} = 1\frac{3}{4}$

Month	Amount (in pounds)
January	3
February	2
March	$1\frac{1}{4}$
April	$1\frac{3}{4}$
May	$\frac{9}{8} = 1\frac{1}{8}$
June	$3\frac{1}{4}$
July	$1\frac{1}{4}$ $2\frac{1}{4}$
August	$2\frac{1}{4}$
September	$\frac{11}{4} = 2\frac{3}{4}$
October	$\frac{3}{4}$

c. In June she bought $\frac{1}{8}$ pound less than three times as much as she bought in May.

$$\left(3 \times \frac{9}{8}\right) - \frac{1}{8} = \frac{27}{8} - \frac{1}{8} = \frac{26}{8} = 3\frac{2}{8} = 3\frac{1}{4}$$

d. Display the data from the table in a line plot.



e. How many pounds of flour did Fantine buy from January to October?

$$3 + 2 + 1\frac{1}{4} + 1\frac{3}{4} + 1\frac{1}{8} + 3\frac{1}{4} + 1\frac{1}{4} + 2\frac{1}{4} + 2\frac{3}{4} + \frac{3}{4}$$

$$16 + \frac{13}{4} + \frac{1}{8}$$

$$16 + 3\frac{1}{4} + \frac{1}{8}$$

$$19\frac{3}{8}$$

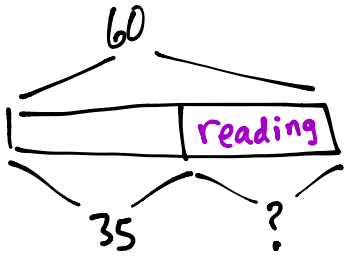
$19\frac{3}{8}$ pounds

Name _____ Date _____

1. Jenny's mom says she has an hour before it's bedtime. Jenny spends $\frac{1}{3}$ of the hour texting a friend and $\frac{1}{4}$ of the time brushing her teeth and putting on her pajamas. She spends the rest of the time reading her book. How many minutes did Jenny read?

$\frac{1}{3}$ of 60 = $\frac{1 \times 60}{3} = 20$

$\frac{1}{4}$ of 60 = $\frac{1 \times 60}{4} = 15$ } 35



60 − 35 = 25 minutes

Jenny read for 25 minutes

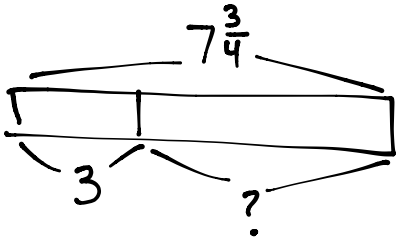
2. A-Plus Auto Body is painting designs on a customer's car. They had 18 pints of blue paint on hand. They used $\frac{1}{2}$ of it for the flames, and $\frac{1}{3}$ of it for the sparks. They need $7\frac{3}{4}$ pints of blue paint to paint the next design. How many more pints of blue paint will they need to buy?

$\frac{1}{2}$ of 18 = $\frac{1 \times 18}{2} = 9$

$\frac{1}{3}$ of 18 = $\frac{1 \times 18}{3} = 6$

Blue used: 9 + 6 = 15

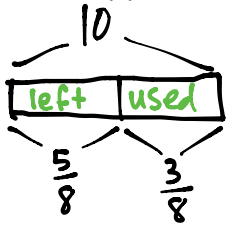
Blue left: 18 − 15 = 3



$7\frac{3}{4} - 3 = 4\frac{3}{4}$

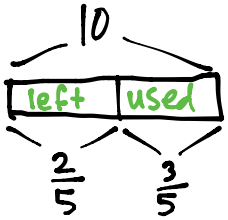
They will need to buy $4\frac{3}{4}$ pint of paint.

3. Giovanna, Frances, and their dad each carried a 10-pound bag of soil into the backyard. After putting soil in the first flower bed, Giovanna's bag was $\frac{5}{8}$ full, Frances' bag was $\frac{2}{5}$ full, and their dad's was $\frac{3}{4}$ full. How many pounds of soil did they put in the first flower bed altogether?



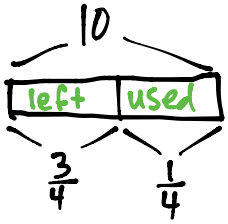
$\frac{3}{8} \times 10 = \frac{3 \times 10^{5}}{8_{4}}$

$= \frac{15}{4} = 3\frac{3}{4}$ pounds



$\frac{3}{5} \times 10 = \frac{3 \times 10^{2}}{5_{1}}$

= 6 pounds



$\frac{1}{4} \times 10 = \frac{1 \times 10^{5}}{2_{4}}$

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

$3\frac{3}{4} + 6 + 2\frac{1}{2}$

$11 + \frac{3}{4} + \frac{2}{4}$

$11 + \frac{5}{4}$

$11 + 1\frac{1}{4} = 12\frac{1}{4}$ pounds

4. Mr. Chan made 252 cookies for the Annual Fifth Grade Class Bake Sale. They sold $\frac{3}{4}$ of them and $\frac{3}{9}$ of the remaining cookies were given to P.T.A. members. Mr. Chan allowed the 12 student-helpers to divide the cookies that were left equally. How many cookies will each student get?

$\frac{3}{4}$ of 252

252

63 | 63 | 63 | 63

$\frac{3}{4}$ were sold

$\frac{3}{9}$ of 63

$= \frac{3}{9} \times 63$

$= \frac{3 \times 63^{7}}{\cancel{9}_{1}}$

$= 21$

63

PTA | left over

$\frac{3}{9}$ given is 21

42

$3\frac{6}{12} = 3\frac{1}{2}$

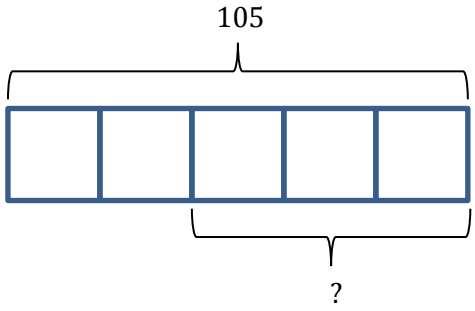
$12\overline{)42}$

-36

6

$3\frac{1}{2}$ cookies per student helper.

5. Create a story problem about a farm for the tape diagram below. Your story must include a fraction.



A farm has 105 acres of land. $\frac{2}{5}$ of the land is planted with corn and the rest is planted with wheat. How many acres are planted with wheat?

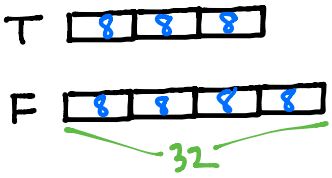
Name _____ Date _____

1. Terrence finished a word search in $\frac{3}{4}$ the time it took Frank. Charlotte finished the word search in $\frac{2}{3}$ the time it took Terrence. Frank finished the word search in 32 minutes. How long did it take Charlotte to finish the word search?

Terrence
$\frac{3}{4}$ of 32
$= \frac{3}{4} \times 32$
$= \frac{3 \times 32^{8}}{1 \cancel{4}}$
= 24 min.

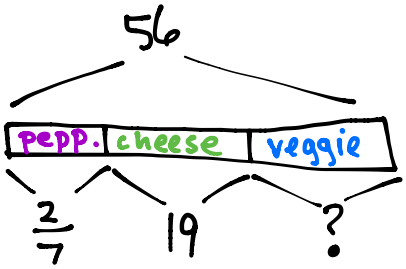
Charlotte
$\frac{2}{3}$ of 24
$= \frac{2}{3} \times 24$
$= \frac{2 \times \cancel{24}^{8}}{1 \cancel{3}}$
= 16 min

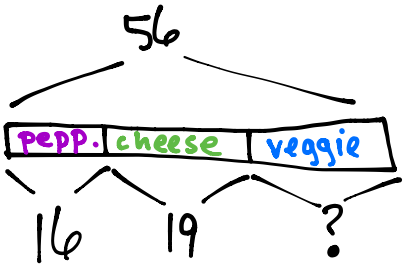
Frank
32 min



It takes 16 minutes for Charlotte to finish.

2. Ms. Phillips ordered 56 pizzas for a school fundraiser. Of the pizzas ordered, $\frac{2}{7}$ of them were pepperoni, 19 were cheese, and the rest were veggie pizzas. What fraction of the pizzas was veggie?





$\frac{2}{7}$ of 56
$= \frac{2}{7} \times 56$
$= \frac{2 \times \cancel{56}^{8}}{1 \cancel{7}}$
= 16 pepperoni pizzas

56 − (16 + 19)
= 56 − 35
= 21 veggie pizzas

$\frac{21}{56}$ (or $\frac{3}{8}$) of the pizzas were veggies.

3. In an auditorium, $\frac{1}{6}$ of the students are fifth graders, $\frac{1}{3}$ are fourth graders, and $\frac{1}{4}$ of the remaining students are second graders. If there are 96 students in the auditorium, how many second graders are there?

5th graders

$\frac{1}{6}$ of 96

$= \frac{1}{6} \times 96$

$= \frac{1 \times 96^{16}}{1 \cancel{6}}$

$= 16$

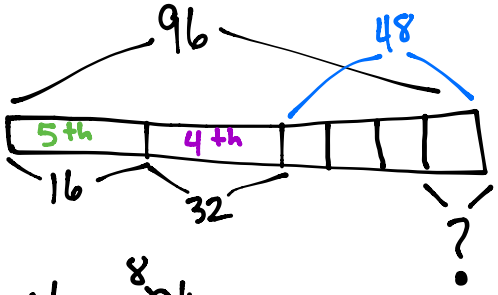
4th graders

$\frac{1}{3}$ of 96

$= \frac{1}{3} \times 96$

$= \frac{1 \times 96^{32}}{1 \cancel{3}}$

$= 32$



$16 + 32 = 48$

$8 \cancel{9}^{1}6 - 48 = 48$

2nd graders

$\frac{1}{4}$ of 48

$= \frac{1}{4} \times 48$

$= \frac{1 \times 48^{12}}{1 \cancel{4}}$

= 12 second graders

4. At a track meet, Jacob and Daniel compete in the 220-m hurdles. Daniel finishes in $\frac{3}{4}$ of a minute. Jacob finishes with $\frac{5}{12}$ of a minute remaining. Who ran the race in the faster time?

Daniel

$\frac{3}{4}$ of 60

$= \frac{3}{4} \times 60$

$= \frac{3 \times 60^{15}}{1 \cancel{4}}$

= 45 seconds

Jacob

$\frac{5}{12}$ of minute remaining $\Rightarrow \frac{7}{12}$ of a minute

$\frac{7}{12}$ of 60 $= \frac{7}{12} \times 60$

$= \frac{7 \times \cancel{60}^{5}}{1 \cancel{12}}$

= 35 seconds

Bonus: Express the difference in their times as a fraction of a minute.

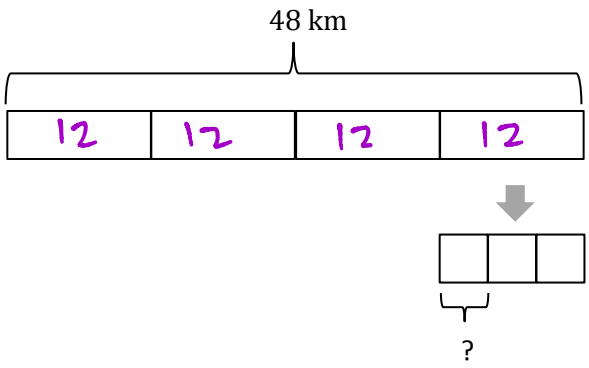
Difference $= 45 - 35$

$= 10$ seconds

$= \frac{1}{6}$ of a minute

$\frac{10}{60} = \frac{1}{6}$

5. Create and solve a story problem about a runner who is training for a race. Include at least one fraction in your story.



Running the same distance each day, a runner runs 48 km in 4 days. On the last day she ran around a lake three times. What is the distance around the lake?

1 big unit = $48 \div 4 = \frac{48}{4} = 12$

1 small unit = $12 \div 3 = \frac{12}{3} = 4$

The distance around the lake is 4 km.

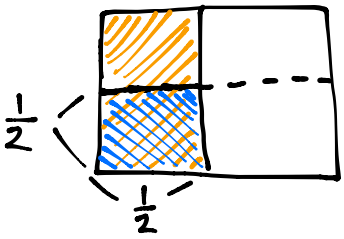
6. Create and solve a story problem about a two friends and their weekly allowance whose solution is given by the expression $\frac{1}{5} \times (12 + 8)$.

Marta's allowance is \$12 each week. Janet's allowance is \$8 each week. They spend $\frac{1}{5}$ of their combined allowance to buy a bag of candy. How much money do they spend on the candy?

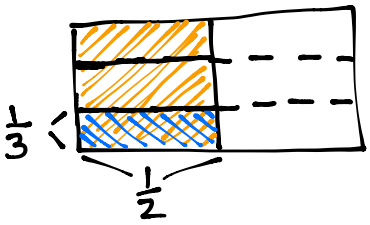
Name _____ Date _____

1. Solve. Draw an area model to show your thinking.

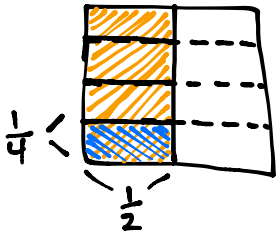
a. Half of $\frac{1}{2}$ cake = $\frac{1}{4}$ cake



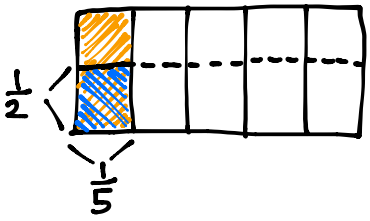
b. One-third of $\frac{1}{2}$ cake = $\frac{1}{6}$ cake



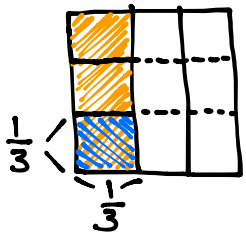
c. $\frac{1}{4}$ of $\frac{1}{2}$ = $\frac{1}{8}$



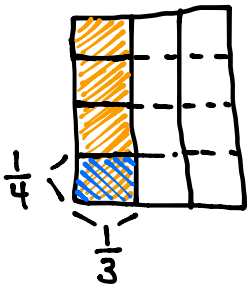
d. $\frac{1}{2} \times \frac{1}{5} = \frac{1}{10}$



e. $\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$



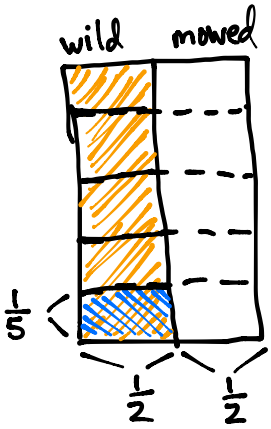
f. $\frac{1}{4} \times \frac{1}{3} = \frac{1}{12}$



2. Noah mows $\frac{1}{2}$ of his property and leaves the rest wild. He decides to use $\frac{1}{5}$ of the wild area for a vegetable garden. What fraction of the property is used for the garden? Draw a picture to support your answer.

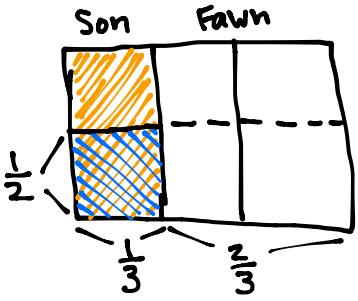
$\frac{1}{5}$ of $\frac{1}{2}$

$= \frac{1}{10}$



$\frac{1}{10}$ of the property is used for the garden.

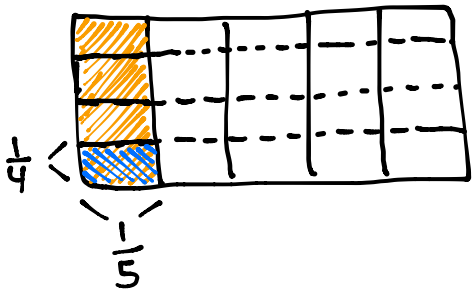
3. Fawn plants $\frac{2}{3}$ of the garden with vegetables. Her son plants the remainder of the garden. He decides to use $\frac{1}{2}$ of his space to plant flowers, and in the rest he plants herbs. What fraction of the entire garden is planted in flowers? Draw a picture to support your answer.



$\frac{1}{2}$ of $\frac{1}{3}$ = $\frac{1}{6}$

$\frac{1}{6}$ of the garden is planted in flowers.

4. Diego eats $\frac{1}{5}$ of a loaf of bread each day. On Tuesday, Diego eats $\frac{1}{4}$ of the day's portion before lunch. What fraction of the whole loaf does Diego eat before lunch on Tuesday? Draw a model to support your thinking.



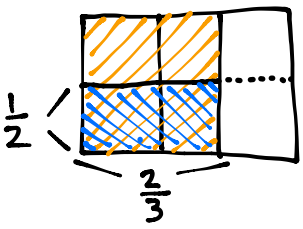
$\frac{1}{4}$ of $\frac{1}{5}$ = $\frac{1}{20}$

Diego ate $\frac{1}{20}$ of the whole loaf before lunch.

Name _____ Date _____

1. Solve. Draw a model to explain your thinking.

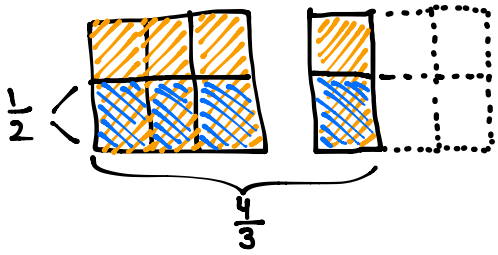
a. $\frac{1}{2}$ of $\frac{2}{3} = \frac{1}{2}$ of 2 thirds = 1 thirds



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

$= \frac{1}{3}$

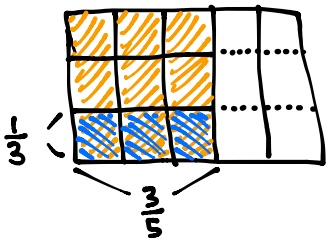
b. $\frac{1}{2}$ of $\frac{4}{3} = \frac{1}{2}$ of 4 thirds = 2 thirds



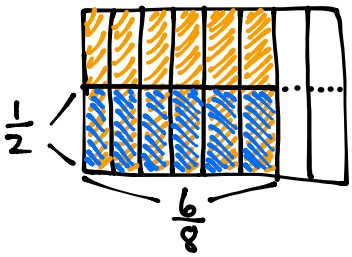
$\frac{1}{2} \times \frac{4}{3} = \frac{4}{6}$

$= \frac{2}{3}$

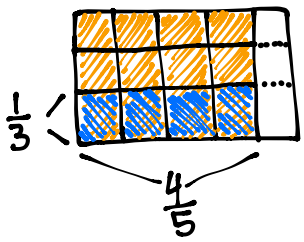
c. $\frac{1}{3}$ of $\frac{3}{5} = \frac{3}{15} = \frac{1}{5}$



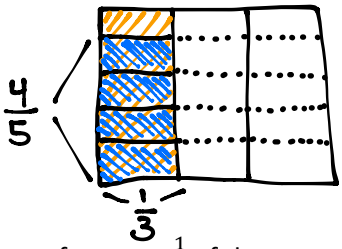
d. $\frac{1}{2} \times \frac{6}{8} = \frac{6}{16} = \frac{3}{8}$



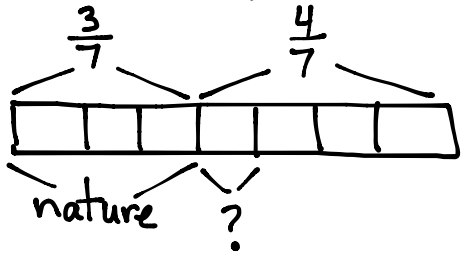
e. $\frac{1}{3} \times \frac{4}{5} = \frac{4}{15}$



f. $\frac{4}{5} \times \frac{1}{3} = \frac{4}{15}$

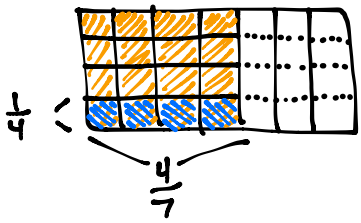


2. Sarah has a photography blog. $\frac{3}{7}$ of her photos are of nature. $\frac{1}{4}$ of the rest are of her friends. What fraction of all Sarah's photos is of her friends? Support your answer with a model.



$\frac{1}{4}$ of $\frac{4}{7} = \frac{1}{4}$ of 4 sevenths = 1 seventh

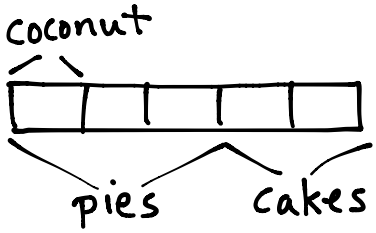
$= \frac{1}{7}$



$\frac{1}{4} \times \frac{4}{7} = \frac{4}{28} = \frac{1}{7}$

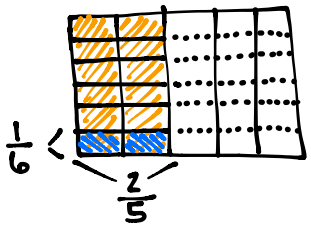
3. At Laurita's Bakery, $\frac{3}{5}$ of the baked goods are pies, and the rest are cakes. $\frac{1}{3}$ of the pies are coconut. $\frac{1}{6}$ of the cakes are angel-food.

   a. What fraction of all of the baked goods at Laurita's Bakery are coconut pies?



$\frac{1}{3}$ of 3 units are coconut. So 1 unit is coconut, which is $\frac{1}{5}$.

   b. What fraction of all of the baked goods at Laurita's Bakery are angel-food cakes?

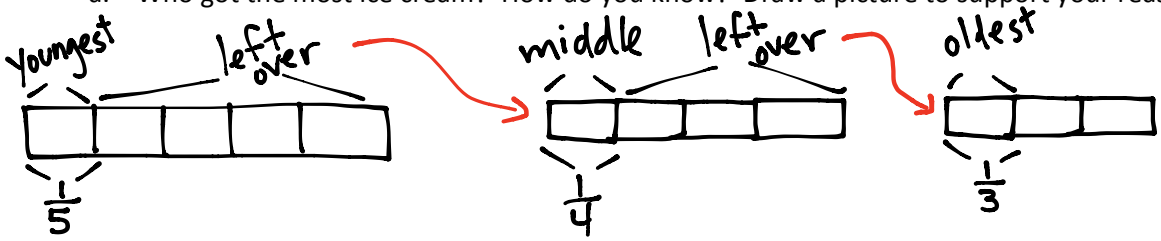


$\frac{1}{6}$ of $\frac{2}{5}$ are angel-food cakes.

$\frac{1}{6} \times \frac{2}{5} = \frac{2}{30} = \frac{1}{15}$

4. Grandpa Mick opened a pint of ice cream. He gave his youngest grandchild $\frac{1}{5}$ of the ice cream and his middle grandchild $\frac{1}{4}$ of the remaining ice cream. Then he gave his oldest grandchild $\frac{1}{3}$ of the ice cream that was left after serving the others.

   a. Who got the most ice cream? How do you know? Draw a picture to support your reasoning.



Each child gets 1 unit, which is $\frac{1}{5}$ of a pint.

   b. What fraction of the pint of ice cream will be left if Grandpa Mick serves himself the same amount as the second grandchild?

If Grandpa takes $\frac{1}{5}$ of a pint, there will be $\frac{1}{5}$ of a pint left over.

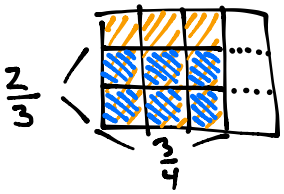
Name _____ Date _____

1. Solve. Draw a model to explain your thinking. Then write a multiplication sentence.

a. $\frac{2}{3}$ of $\frac{3}{4}$

$\frac{2}{3} \times \frac{3}{4} = \frac{6}{12}$

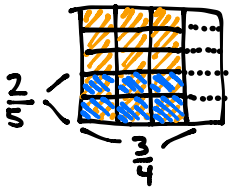
$= \frac{1}{2}$



b. $\frac{2}{5}$ of $\frac{3}{4}$

$\frac{2}{5} \times \frac{3}{4} = \frac{6}{20}$

$= \frac{3}{10}$

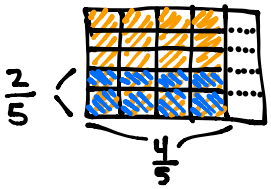


c. $\frac{2}{5}$ of $\frac{4}{5}$

$\frac{2}{5} \times \frac{4}{5} = \frac{8}{20}$

$= \frac{4}{10}$

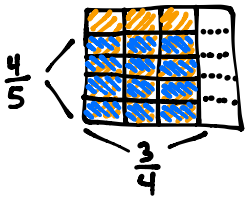
$= \frac{2}{5}$



d. $\frac{4}{5}$ of $\frac{3}{4}$

$\frac{4}{5} \times \frac{3}{4} = \frac{12}{20}$

$= \frac{3}{5}$



2. Multiply. Draw a model if it helps you.

a. $\frac{5}{6} \times \frac{3}{10} = \frac{5 \times 3}{6 \times 10} = \frac{1 \times 1}{2 \times 2} = \frac{1}{4}$

b. $\frac{3}{4} \times \frac{4}{5} = \frac{3 \times 4}{4 \times 5} = \frac{3 \times 1}{1 \times 5} = \frac{3}{5}$

c. $\frac{5}{6} \times \frac{5}{8} = \frac{5 \times 5}{6 \times 8} = \frac{25}{48}$

d. $\frac{3}{4} \times \frac{5}{12} = \frac{3 \times 5}{4 \times 12} = \frac{5}{16}$

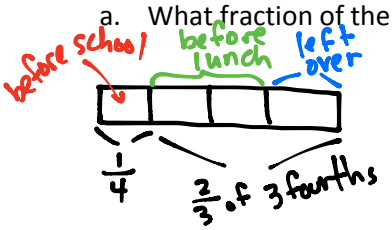
e. $\frac{8}{9} \times \frac{3}{2} = \frac{8 \times 3}{9 \times 2} = \frac{4}{3}$

$= 1\frac{1}{3}$

f. $\frac{3}{7} \times \frac{2}{9} = \frac{3 \times 2}{7 \times 9} = \frac{2}{21}$

3. Every morning, Halle goes to school with a 1 liter bottle of water. She drinks $\frac{1}{4}$ of the bottle before school starts and $\frac{2}{3}$ of the rest before lunch.

a. What fraction of the bottle does Halle drink ~~before lunch?~~ after school starts, but before lunch?



$\frac{2}{3}$ of $\frac{3}{4} = \frac{2}{4} = \frac{1}{2}$

Halle drinks $\frac{1}{2}$ of the bottle.

$\frac{2}{3}$ of $\frac{3}{4}$

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

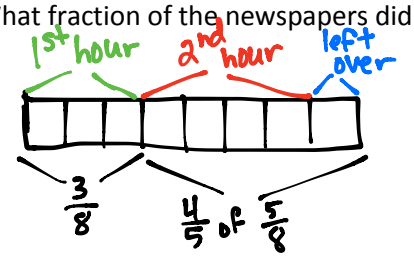
$= \frac{1}{2}$

b. How many milliliters are left in the bottle at lunch?

$\frac{1}{4}$ of a liter is left over

$\frac{1}{4} \times 1000 = 250$ milliliters

4. Moussa delivered $\frac{3}{8}$ of the newspapers on his route in the first hour and $\frac{4}{5}$ of the rest in the second hour. What fraction of the newspapers did Moussa deliver in the second hour?



2nd hour: $\frac{4}{8} = \frac{1}{2}$

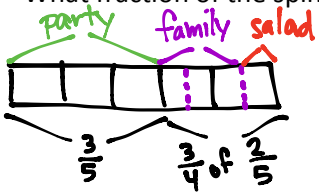
$\frac{4}{5}$ of $\frac{5}{8} = \frac{4}{5} \times \frac{5}{8}$

$= \frac{4 \times 5}{5 \times 8}$

$= \frac{1}{2}$

5. Rose bought some spinach. She used $\frac{3}{5}$ of the spinach on a pan of spinach pie for a party, and $\frac{3}{4}$ of the remaining spinach for a pan for her family. She used the rest of the spinach to make a salad.

a. What fraction of the spinach did she use to make the salad?

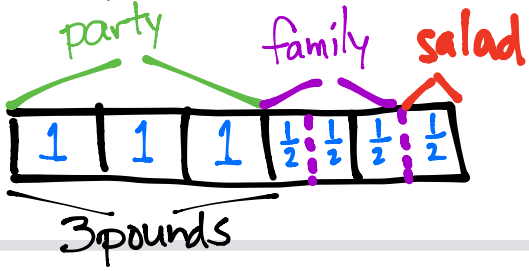


$\frac{3}{4}$ of $\frac{2}{5} = \frac{3}{4} \times \frac{2}{5}$

$= \frac{3 \times 2}{4 \times 5} = \frac{3}{10}$ for pan

$\frac{1}{10}$ is left for the salad.

b. If Rose used 3 pounds of spinach to make the pan of spinach pie for the party, how many pounds of spinach did Rose use to make the salad?



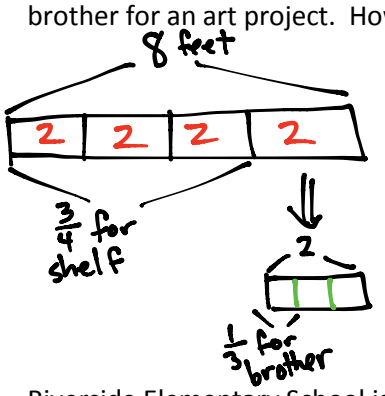
$\frac{3}{5}$ is 3 pounds, so each tenth is $\frac{1}{2}$ pound.

Rose used $\frac{1}{2}$ pound for the salad.

Name _____ Date _____

Solve using tape diagrams.

1. Anthony bought an 8-foot board. He cut off $\frac{3}{4}$ of the board to build a shelf, and gave $\frac{1}{3}$ of the rest to his brother for an art project. How many inches long was the piece Anthony gave to his brother?



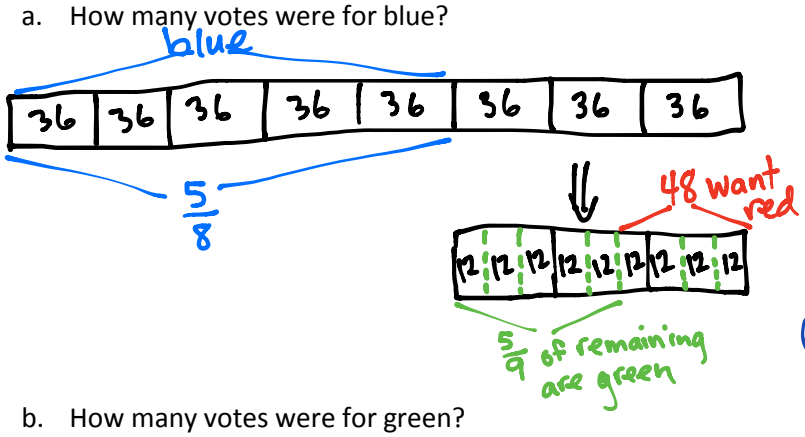
$\frac{1}{3}$ of $2 = \frac{1}{3} \times 2$
$= \frac{1 \times 2}{3}$
$= \frac{2}{3}$
$\frac{2}{3}$ foot for brother

$\frac{2}{3}$ of foot $= \frac{2}{3} \times 12$ inches
$= \frac{2 \times 12^{4}}{1 \quad 3}$
$= 8$ inches

8 inches for brother

2. Riverside Elementary School is holding a school-wide election to choose a school color. Five-eighths of the votes were for blue, $\frac{5}{9}$ of the remaining votes were for green, and the remaining 48 votes were for red.

a. How many votes were for blue?



4 small units = 48
1 small unit = $48 \div 4 = 12$

3 small units = 1 big unit = 36

blue is 5 big units: $\begin{array}{r} 36 \\ \times \quad 5 \\ \hline 180 \end{array}$ votes for blue

180 votes for blue

b. How many votes were for green?

1 small unit is 12 votes

green is 5 small units

$\begin{array}{r} 12 \\ \times \quad 5 \\ \hline 60 \end{array}$ votes

60 votes for green

c. If every student got one vote, but there were 25 students absent on the day of the vote, how many students are there at Riverside Elementary School?

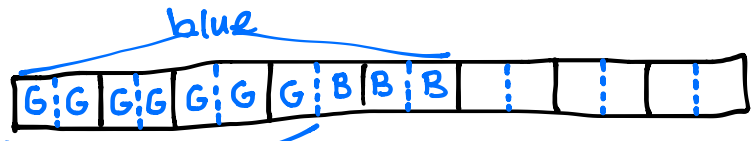
$36 \times 8 = 288$

288 total votes, but 25 are absent.

$288 + 25 = 313$

313 total students.

d. Seven-tenths of the votes for blue were made by girls. Did girls who voted for blue make up more than or less than half of all votes? Support your reasoning with a picture.



$\frac{7}{10}$ of blue were girl votes

7 small units were blue votes by girls.

9 small units are left over.

Less than $\frac{1}{2}$ of all votes.

e. How many girls voted for blue?

$\frac{7}{10}$ of $180 = \frac{7}{10} \times 180$

$= \frac{7 \times 18\cancel{0}^{18}}{\cancel{10}_{1}}$

$= 126$

126 girls voted for blue.

This is less than half of all votes.

Name _____ Date _____

1. Multiply and model. Rewrite each expression as a number sentence with decimal factors. The first one is done for you.

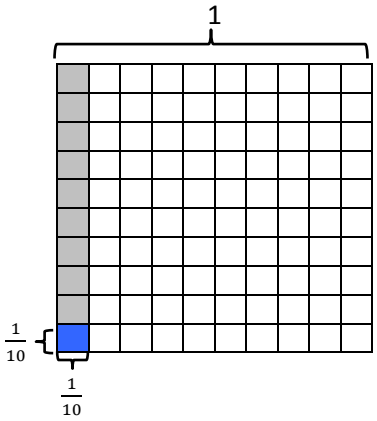
$0.6 \times 0.2 = 0.12$

a. $\frac{1}{10} \times \frac{1}{10}$

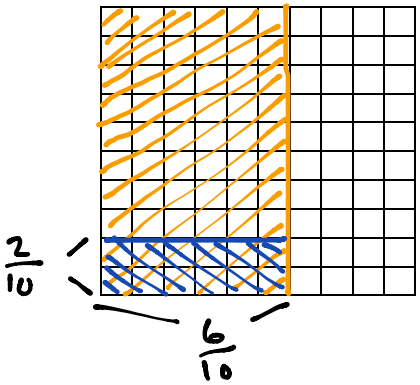
$= \frac{1 \times 1}{10 \times 10}$

$= \frac{1}{100}$

$0.1 \times 0.1 = 0.01$



b. $\frac{6}{10} \times \frac{2}{10} = \frac{6 \times 2}{10 \times 10} = \frac{12}{100}$

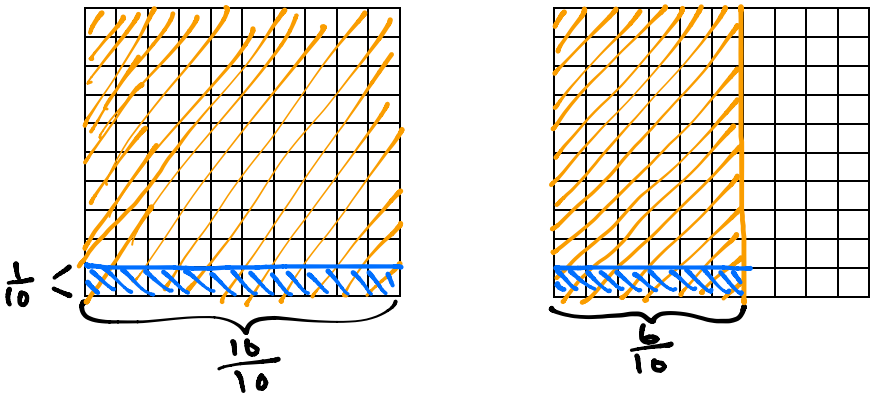


c. $\frac{1}{10} \times 1.6$

$= \frac{1}{10} \times \frac{16}{10}$

$= \frac{16}{100}$

$0.1 \times 1.6 = 0.16$



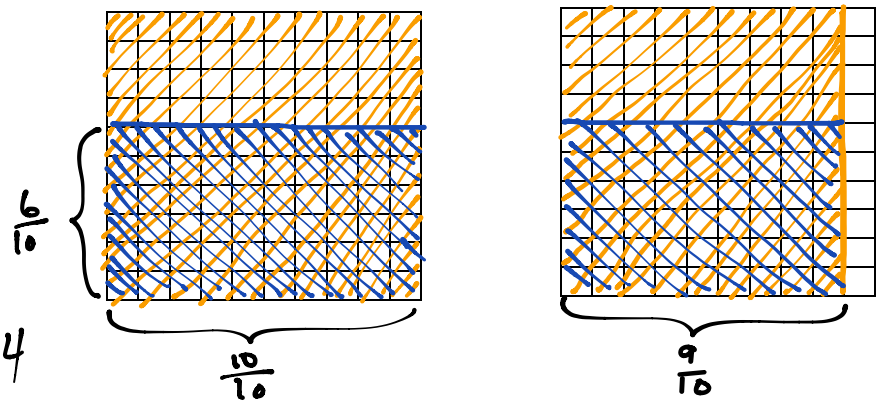
d. $\frac{6}{10} \times 1.9$

$= \frac{6}{10} \times \frac{19}{10}$

$= \frac{114}{100}$

$= 1\frac{14}{100}$

$0.6 \times 1.9 = 1.14$



2. Multiply. The first few are started for you.

a. $4 \times 0.6 = 2.4$

$= 4 \times \frac{6}{10}$

$= \frac{4 \times 6}{10}$

$= \frac{24}{10}$

$= 2.4$

b. $0.4 \times 0.6 = 0.24$

$= \frac{4}{10} \times \frac{6}{10}$

$= \frac{4 \times 6}{10 \times 10}$

$= \frac{24}{100}$

$= 0.24$

c. $0.04 \times 0.6 = 0.024$

$= \frac{4}{100} \times \frac{6}{10}$

$= \frac{4 \times 6}{100 \times 10}$

$= \frac{24}{1000}$

$= 0.024$

d. $7 \times 0.3 = 2.1$

$= 7 \times \frac{3}{10}$

$= \frac{7 \times 3}{10}$

$= \frac{21}{10} = 2.1$

e. $0.7 \times 0.3 = 0.21$

$= \frac{7}{10} \times \frac{3}{10}$

$= \frac{7 \times 3}{10 \times 10}$

$= \frac{21}{100}$

f. $0.07 \times 0.3 = 0.021$

$= \frac{7}{100} \times \frac{3}{10}$

$= \frac{7 \times 3}{100 \times 10}$

$= \frac{21}{1000} = 0.021$

g. $1.3 \times 5 = 6.5$

$= \frac{13}{10} \times 5$

$= \frac{13 \times 5}{10}$

$= \frac{65}{10} = 6.5$

h. $1.3 \times 0.5 = 0.65$

$= \frac{13}{10} \times \frac{5}{10}$

$= \frac{65}{100} = 0.65$

i. $0.13 \times 0.5 = 0.065$

$= \frac{13}{100} \times \frac{5}{10}$

$= \frac{13 \times 5}{100 \times 10}$

$= \frac{65}{1000} = 0.065$

3. Jennifer makes 1.7 liters of lemonade. If she pours 3 tenths of the lemonade in the glass, how many liters of lemonade are in the glass?

$0.3 \times 1.7 = \frac{3}{10} \times \frac{17}{10} = \frac{51}{100} = 0.51$

0.51 L is in the glass

4. Cassius walked 6 tenths of a 3.6 mile trail.

a. How many miles did Cassius have left to hike?

$0.6 \times 3.6 = \frac{6}{10} \times \frac{36}{10} = \frac{216}{100} = 2.16$

$3.6 = 3.60$

$3.60 - 2.16 = 1.44$

1.44 mi left to hike.

b. Cameron was 1.3 miles ahead of Cassius. How many miles did Cameron hike already?

$2.16 + 1.3$

$2.16 + 1.30 = 3.46$

Cameron hiked 3.46 miles.

Name _____ Date _____

1. Multiply using fraction form and unit form. Check your answer by counting the decimal places. The first one is done for you.

a. $3.3 \times 1.6 = \frac{33}{10} \times \frac{16}{10}$

$= \frac{33 \times 16}{100}$

$= \frac{528}{100}$

$= 5.28$

3 3 tenths
× 1 6 tenths
1 9 8
+ 3 3 0
5 2 8 hundredths

b. $3.3 \times 0.8 =$

$= \frac{33}{10} \times \frac{8}{10}$

$= \frac{264}{100}$

$= 2.64$

2
3 3 tenths
× 8 tenths
26 4 hundredths
2.64

c. $4.4 \times 3.2 =$

$= \frac{44}{10} \times \frac{32}{10}$

$= \frac{44 \times 32}{100}$

$= \frac{1408}{100}$

$= 14.08$

1 44 tenths
× 32 tenths
88
1320
1408 hundredths
14.08

d. $2.2 \times 1.6 =$

$= \frac{22}{10} \times \frac{16}{10}$

$= \frac{22 \times 16}{100}$

$= \frac{352}{100}$

$= 3.52$

1
22 tenths
× 16 tenths
132
220
352 hundredths
3.52

2. Multiply. The first one is partially done for you.

a. $3.36 \times 1.4 = \frac{336}{100} \times \frac{14}{10}$

$= \frac{336 \times 14}{1{,}000}$

$= \frac{4{,}704}{1{,}000}$

$= 4.704$

3 3 6 hundredths
× 1 4 tenths
1344
+ 3360
4704 thousandths
4.704

b. $3.35 \times 0.7 =$

$= \frac{335}{100} \times \frac{7}{10}$

$= \frac{335 \times 7}{1000}$

$= \frac{2345}{1000}$

$= 2.345$

3 3 5 hundredths
× 7 tenths
2345 thousandths
2.345

c. $4.04 \times 3.2 =$

$= \frac{404}{100} \times \frac{32}{10}$

$= \frac{404 \times 32}{1000}$

$= \frac{12928}{1000}$

$= 12.928$

404 hundredths
× 32 tenths
808
12120
12928 thousandths
12.928

d. $4.4 \times 0.16 =$

$= \frac{44}{10} \times \frac{16}{100}$

$= \frac{44 \times 16}{1000}$

$= \frac{704}{1000}$

$= 0.704$

44 tenths
× 16 hundredths
264
440
704 thousandths
0.704

3. Solve using the standard algorithm. Show your thinking about the units of your product. The first one is done for you.

a. $3.2 \times 0.6 = 1.92$

$\frac{32}{10} \times \frac{6}{10} = \frac{32 \times 6}{100}$

3 2 tenths
× 6 tenths
1 9 2 hundredths

1.92

b. $2.3 \times 2.1 = 4.83$

$\frac{23}{10} \times \frac{21}{10} = \frac{23 \times 21}{100}$

2 3 tenths
× 2 1 tenths
2 3
+ 4 6 0
4 8 3 hundredths

4.83

c. $7.41 \times 3.4 = 25.194$

741 hundredths
× 34 tenths
2964
22230
25194 thousandths
25.194

$\frac{741}{100} \times \frac{34}{10} = \frac{741 \times 34}{1000}$

d. $6.50 \times 4.5 = 29.25$

$\frac{650}{100} \times \frac{45}{10} = \frac{650 \times 45}{1000}$

650 hundredths
× 45 tenths
3250
+ 26000
29250 thousandths
29.250

4. Erik buys 2.5 pounds of cashews. If each pound of cashews costs $7.70, how much will he pay for the cashews?

7.70 → 770 hundredths
× 2.5 → × 25 tenths
3850
+ 15400
19250 thousandths
19.25

$19.25

5. A swimming pool at a park measures 9.75 meters by 7.2 meters.

a. Find the area of the swimming pool.

9.75 → 975 hundredths
× 7.2 → × 72 tenths
1950
+ 68250
70200 thousandths
70.2

The area of the pool is 70.2 sq. m.

b. The area of the playground is one and a half times that of the swimming pool. Find the total area of the swimming pool and the playground.

70.2 → 702 tenths
× 1.5 × 15 tenths
3510
+ 7020
10530 hundredths
105.3

105.3
+ 70.2
175.5

The total area is 175.5 m^2.

Name _____ Date _____

1. Convert. Express your answer as a mixed number if possible.

a. 2 ft = $\frac{2}{3}$ yd 2 ft = 2 × 1 ft = 2 × $\frac{1}{3}$ yd = $\frac{2}{3}$ yd	b. 6 ft = 2 yd 6 ft = 6 × 1 ft = 6 × $\frac{1}{3}$ yd = $\frac{6}{3}$ yd = 2 yards
c. 5 in = $\frac{5}{12}$ ft 5 in = 5 × 1 in = 5 × $\frac{1}{12}$ ft = $\frac{5}{12}$ ft.	d. 14 in = $1\frac{2}{12}$ ft = $1\frac{1}{6}$ ft 14 in = 14 × 1 in = 14 × $\frac{1}{12}$ ft = $\frac{14}{12}$ ft = $1\frac{2}{12}$ = $1\frac{1}{6}$ ft
e. 7 oz = $\frac{7}{16}$ lb 7 oz = 7 × 1 oz. = 7 × $\frac{1}{16}$ lb. = $\frac{7}{16}$ lb.	f. 20 oz = $1\frac{4}{16}$ lb = $1\frac{1}{4}$ lb 20 oz = 20 × 1 oz = 20 × $\frac{1}{16}$ lb = $\frac{20}{16}$ lb = $1\frac{4}{16}$ lb = $1\frac{1}{4}$ lb
g. 1 pt = $\frac{1}{2}$ qt 1 pt = 1 × 1 pt = 1 × $\frac{1}{2}$ qt = $\frac{1}{2}$ qt	h. 4 pt = 2 qt 4 pt = 4 × 1 pt = 4 × $\frac{1}{2}$ qt = $\frac{4}{2}$ qt = 2 qt

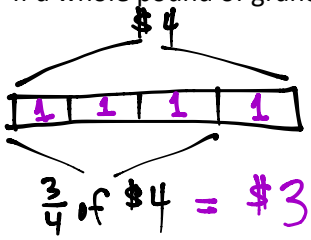
2. Marty buys 12 oz of granola.
   a. What fraction of a pound of granola did Marty buy?

12 oz = ___ lb
= 12 × 1 oz
= 12 × $\frac{1}{16}$ lb = $\frac{12}{16}$ lb

$\frac{12}{16}$ lb or $\frac{3}{4}$ lb

Marty bought $\frac{3}{4}$ lb of granola.

   b. If a whole pound of granola costs $4, how much did Marty pay?



Marty paid $3

3. Sara and her dad visit Yo-Yo Yogurt again. This time, the scale says that Sara has 14 oz of vanilla yogurt in her cup. Her father's yogurt weighs half as much. How many pounds of frozen yogurt did they buy altogether on this visit? Express your answer as a mixed number.

Sara = 14 oz.

Dad = 7 oz

14 × 0.5 = 14 × $\frac{5}{10}$
= $\frac{14 \times 5}{10}$
= $\frac{70}{10}$ = 7

21 oz = 16 oz + 5 oz
= $1\frac{5}{16}$ lb.

4. An art teacher uses 1 quart of blue paint each month. In one year, how many gallons of paint will she use?

1 quart × 12 = 12 quarts

12 quarts = 12 × 1 quart
= 12 × $\frac{1}{4}$ gallon
= $\frac{12}{4}$ gallon
= 3 gallons

She will use 3 gallons in one year.

Name _____ Date _____

1. Convert. Show your work. Express your answer as a mixed number. The first one is done for you.

a. $2\frac{2}{3}$ yd = 8 ft

$2\frac{2}{3}$ yd $= 2\frac{2}{3} \times 1$ yd
$= 2\frac{2}{3} \times 3$ ft
$= \frac{8}{3} \times 3$ ft
$= \frac{24}{3}$ ft
$= 8$ ft

b. $1\frac{1}{4}$ ft = $\frac{5}{12}$ yd

$1\frac{1}{4}$ ft $= 1\frac{1}{4} \times 1$ ft
$= 1\frac{1}{4} \times \frac{1}{3}$ yd
$= \frac{5}{4} \times \frac{1}{3}$ yd
$= \frac{5}{12}$ yd

c. $3\frac{5}{6}$ ft = 46 in

$3\frac{5}{6}$ ft $= 3\frac{5}{6} \times 1$ ft
$= \frac{23}{6} \times 12$ in
$= \frac{23 \times 12^{2}}{1\ 6}$ in
$= 46$ in

d. $7\frac{1}{2}$ pt = $3\frac{3}{4}$ qt

$7\frac{1}{2}$ pt $= 7\frac{1}{2} \times 1$ pt
$= \frac{15}{2} \times \frac{1}{2}$ qt
$= \frac{15}{4}$ qt
$= 3\frac{3}{4}$ qt

e. $4\frac{3}{10}$ hr = 258 min

$4\frac{3}{10}$ hr $= 4\frac{3}{10} \times 1$ hr
$= \frac{43}{10} \times 60$ min
$= \frac{43 \times 60^{6}}{1\ 10}$ min
$= 258$ min

f. 33 months = $2\frac{9}{12}$ years $= 2\frac{3}{4}$ years

33 mo. $= 33 \times 1$ mo
$= 33 \times \frac{1}{12}$ yr
$= \frac{33}{12}$ yr
$= 2\frac{9}{12}$ yr
$= 2\frac{3}{4}$ yr

2. Four members of a track team run a relay race in 165 seconds. How many minutes did it take them to run the race?

165 seconds = ___ minutes

165 sec = 165 x 1 sec

= 165 x $\frac{1}{60}$ min

= $\frac{165}{60}$ min

= 2 $\frac{45}{60}$ min

$2\frac{45}{60}$ min = $2\frac{3}{4}$ min

3. Horace buys $2\frac{3}{4}$ lb of blueberries for a pie. He needs 48 oz of blueberries for the pie. How many more pounds of blueberries does he need to buy?

$2\frac{3}{4}$ lb = ___ oz

$2\frac{3}{4}$ lb = $2\frac{3}{4}$ x 1 lb

= $\frac{11}{4}$ x 16 oz

= $\frac{11 \times \cancel{16}^{4}}{\cancel{4}_{1}}$ oz

= 44 oz

48 − 44 = 4

He needs to buy 4 more ounces, which is $\frac{4}{16}$ pound.

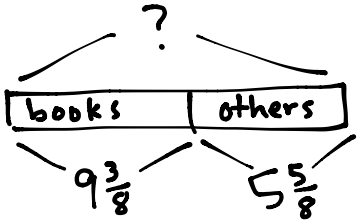
$\frac{4}{16} = \frac{1}{4}$ pound

4. Tiffany is sending a package that may not exceed 16 lb. The package contains books that weigh a total of $9\frac{3}{8}$ lb. The other items to be sent weigh $\frac{3}{5}$ the weight of the books. Will Tiffany be able to send the package?

$\frac{3}{5} \times 9\frac{3}{8} = \frac{3}{\cancel{5}_{1}} \times \frac{\cancel{75}^{15}}{8}$

= $\frac{45}{8}$

= $5\frac{5}{8}$



$9\frac{3}{8} + 5\frac{5}{8} = 14\frac{8}{8}$

= 15 pounds

Yes, Tiffany will be able to send the package.

Name _____ Date _____

1. Fill in the blanks.

a. $\frac{1}{3} \times 1 = \frac{1}{3} \times \frac{3}{3} = \frac{3}{9}$

b. $\frac{2}{3} \times 1 = \frac{2}{3} \times \frac{7}{7} = \frac{14}{21}$

c. $\frac{5}{2} \times 1 = \frac{5}{2} \times \frac{5}{5} = \frac{25}{10}$

d. Compare the first factor to the value of the product.

The first factor is equal to the product because it was multiplied by 1 each time. Anything multiplied by 1 always equals itself.

2. Express each fraction as an equivalent decimal.

a. $\frac{3}{4} \times \frac{25}{25} = \frac{3 \times 25}{4 \times 25} = \frac{75}{100} = 0.75$

b. $\frac{1}{4} \times \frac{25}{25} = \frac{1 \times 25}{4 \times 25} = \frac{25}{100} = 0.25$

c. $\frac{2}{5} \times \frac{2}{2} = \frac{2 \times 2}{5 \times 2} = \frac{4}{10} = 0.4$

d. $\frac{3}{5} \times \frac{2}{2} = \frac{6}{10} = 0.6$

e. $\frac{3}{20} \times \frac{5}{5} = \frac{15}{100} = 0.15$

f. $\frac{25}{20} \times \frac{5}{5} = \frac{125}{100} = 1.25$

g. $\frac{23}{25} \times \frac{4}{4} = \frac{92}{100} = 0.92$

h. $\frac{89}{50} \times \frac{2}{2} = \frac{178}{100} = 1.78$

i. $3\frac{11}{25} \times \frac{4}{4} = 3\frac{44}{100} = 3.44$

j. $5\frac{41}{50} \times \frac{2}{2} = 5\frac{82}{100} = 5.82$

3. $\frac{6}{8}$ is equivalent to $\frac{3}{4}$. How can you use this to help you write $\frac{6}{8}$ as a decimal? Show your thinking to solve.

$\frac{6}{8} = \frac{3}{4} \times \frac{25}{25} = \frac{75}{100} = 0.75$

It is much easier to multiply by 4 to get 100 than to multiply by 8 to get 100.

4. A number multiplied by a fraction is not always smaller than what you start with. Explain this, and give at least two examples to support your thinking.

$10 \times \frac{7}{5} = \frac{2}{\cancel{10}} \times \frac{7}{\cancel{5}_1} = 14$

$9 \times \frac{4}{3} = \frac{3}{\cancel{9}} \times \frac{4}{\cancel{3}_1} = 12$

If the fraction is greater than 1, then the number being multiplied will get larger.

5. Elise has $\frac{3}{4}$ dollar. She buys a stamp that costs 44 cents. Change both numbers into decimals, and tell how much money Elise has after paying for the stamp.

$\frac{3}{4} \times \frac{25}{25} = \frac{75}{100} = 0.75$

44 cents = 0.44

$$\begin{array}{r} 0.75 \\ -0.44 \\ \hline 0.31 \end{array}$$

Elise will have 31 cents after paying for the stamp.

Name _____ Date _____

1. Solve for the unknown. Rewrite each phrase as a multiplication sentence. Circle the scaling factor and put a box around the number of meters.

a. $\frac{1}{3}$ as long as 6 meters = 2 meters

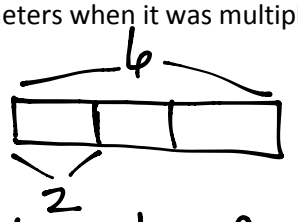
$\frac{1}{3} \times 6 = \frac{6}{3} = 2$

b. 6 times as long as $\frac{1}{3}$ meter = 2 meters

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

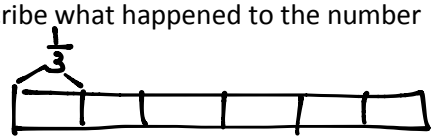
2. Draw a tape diagram to model each situation in Problem 1, and describe what happened to the number of meters when it was multiplied by the scaling factor.

a.



Since the scaling factor is less than 1, the # of meters decreased.

b.



The scaling factor is greater than 1, so the # of meters increased from $\frac{1}{3}$ to 2.

3. Fill in the blank with a numerator or denominator to make the number sentence true.

a. $5 \times \frac{7}{3} > 9$ b. $\frac{6}{6} \times 12 < 13$ c. $4 \times \frac{5}{5} = 4$

4. Look at the inequalities in each box. Choose a single fraction to write in all three blanks that would make all three number sentences true. Explain how you know.

a. $\frac{2}{3} \times \frac{7}{5} > \frac{2}{3}$ $4 \times \frac{7}{5} > 4$ $\frac{5}{3} \times \frac{7}{5} > \frac{5}{3}$

Any fraction greater than 1 will work.

b. $\frac{2}{3} \times \frac{3}{4} < \frac{2}{3}$ $4 \times \frac{3}{4} < 4$ $\frac{5}{3} \times \frac{3}{4} < \frac{5}{3}$

Any fraction less than 1 will work.

5. Write a number in the blank that will make the number sentence true.

a. $3 \times \frac{1}{10} < 1$

b. Explain how multiplying by a whole number can result in a product less than 1.

In general, multiplying by a fraction less than 1 will make a number get smaller. If the goal is to get a product less than 1, then the fraction can be a unit fraction with a denominator that is larger than the # being multiplied. In part (a), any denominator bigger than 3 would work.

6. In a sketch, a fountain is drawn $\frac{1}{4}$ yard tall. The actual fountain will be 68 times as tall. How tall will the fountain be?

$\frac{1}{4}$ yd $\times 68 = \frac{1}{4} \times 68$ yd

$= \frac{68}{4}$ yd

$= 17$ yd

The fountain will be 17yd tall.

7. In blueprints, an architect's firm drew everything $\frac{1}{24}$ of the actual size. The windows will actually measure 4 ft by 6 ft and doors measure 12 ft by 8 ft. What are the dimensions of the windows and the doors in the drawing?

windows

$\frac{1}{24} \times 4$ ft $= \frac{1 \times 4}{24} = \frac{4}{24} = \frac{1}{6}$ ft

$\frac{1}{24} \times 6$ ft $= \frac{1 \times 6}{24} = \frac{6}{24} = \frac{1}{4}$ ft

$\frac{1}{6}$ ft by $\frac{1}{4}$ ft
OR
2 in by 3 in

doors

$\frac{1}{24} \times 12$ ft $= \frac{1 \times 12}{24}$ ft $= \frac{12}{24} = \frac{1}{2}$ ft

$\frac{1}{24} \times 8$ ft $= \frac{1 \times 8}{24}$ ft $= \frac{8}{24} = \frac{1}{3}$ ft.

$\frac{1}{2}$ ft by $\frac{1}{3}$ ft
OR
6 in by 4 in

Name _____ Date _____

1.

a. Sort the following expressions by rewriting them in the table.

The product is less than the boxed number:	The product is greater than the boxed number:
828 × 0.921	12.5 × 1.989
0.05 × 0.1	0.007 × 1.02
	2.16 × 1.11
	321.46 × 1.26

12.5 × 1.989 828 × 0.921 321.46 × 1.26

0.007 × 1.02 2.16 × 1.11 0.05 × 0.1

b. What do the expressions in each column have in common?

Boxes in the "less than" column are multiplied by a number less than 1.

Boxes in the "greater than" column are multiplied by a number greater than 1.

2. Write a statement using one of the following phrases to compare the value of the expressions. Then explain how you know.

is slightly more than ***is a lot more than*** ***is slightly less than*** ***is a lot less than***

a. 14 × 0.999 is slightly less than 14 because 0.999 is slightly less than 1

b. 1.01 × 2.06 is slightly more than 2.06 because 1.01 is slightly more than 1.

c. 1,955 × 0.019 is a lot less than 1,955 because 0.019 is a lot less than 1.

d. Two thousand × 1.0001 is slightly more than two thousand because 1.0001 is slightly more than 1.

e. Two-thousandths × 0.911 is slightly less than two-thousandths because 0.911 is slightly less than 1.

3. Rachel is 1.5 times as heavy as her cousin, Kayla. Another cousin, Jonathan, weighs 1.25 times as much as Kayla. List the cousins, from lightest to heaviest, and explain your thinking.

Kayla < Jonathan < Rachel

Rachel is heavier than Jonathan because she is 1.5 times heavier than Kayla while Jonathan is only 1.25 times heavier than Kayla. This makes Kayla the lightest.

4. Circle your choice.

a. $a \times b > a$

For this statement to be true, b must be **(greater than 1)** **less than 1**

Write two expressions that support your answer. Be sure to include one decimal example.

$7 \times \frac{5}{3} > 7$

$\frac{35}{3} = 11\frac{2}{3} > 7$

$7 \times 1.8 > 7$

$12.6 > 7$

b. $a \times b < a$

For this statement to be true, b must be **greater than 1** **(less than 1)**

Write two expressions that support your answer. Be sure to include one decimal example.

$6 \times \frac{1}{2} < 6$

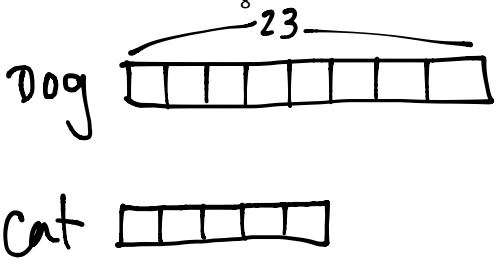
$\frac{6}{2} = 3 < 6$

$8 \times 0.7 < 8$

$5.6 < 8$

Name _____ Date _____

1. Jesse takes his dog and cat for their annual vet visit. Jesse's dog weighs 23 pounds. The vet tells him his cat's weight is $\frac{5}{8}$ as much as his dog's weight. How much does his cat weigh?

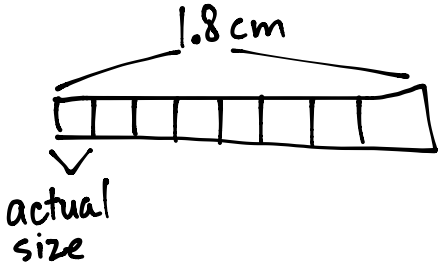


$\frac{5}{8}$ of $23 = \frac{5 \times 23}{8}$

$= \frac{115}{8}$

$= 14\frac{3}{8}$ lb or 14.375 lb

2. An image of a snowflake is 1.8 centimeters wide. If the actual snowflake is $\frac{1}{8}$ the size of the image, what is the width of the actual snowflake? Express your answer as a decimal.



$\frac{1}{8}$ of $1.8 = \frac{1}{8} \times \frac{18}{10}$

$= \frac{1 \times 18^{9}}{4 \times 10}$

$= \frac{9}{40} \times \frac{25}{25} = \frac{225}{1000} = 0.225$

The snowflake is 0.225 cm wide

3. A community bike ride offers a short ride for children and families, which is 5.7 miles, followed by a long ride for adults, which is $5\frac{2}{3}$ times as long. If a woman bikes the short ride with her children, and then the long ride with her friends, how many miles does she ride altogether?

$5\frac{2}{3} \times 5.7 = 5\frac{2}{3} \times 5\frac{7}{10}$

$= \frac{17}{3} \times \frac{57}{10}$

$= \frac{17 \times 57^{19}}{1 3 \times 10}$

$= \frac{323}{10} = 32.3$ miles

$$\begin{array}{r} {}^{1} \\ 32.3 \\ +\ 5.7 \\ \hline 38.0 \end{array}$$

She rides 38 miles altogether.

4. Sal bought a house for \$78,524.60. Twelve years later he sold the house for $2\frac{3}{4}$ times as much. What was the sale price of the house?

$2\frac{3}{4} = 2.75$

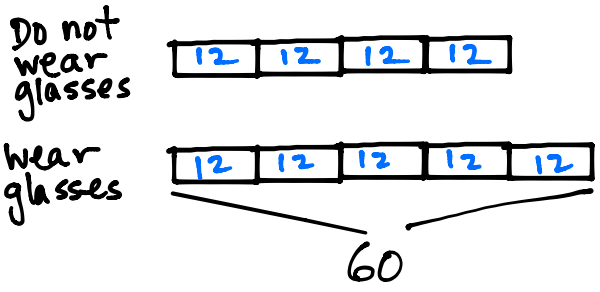
78524.60 → 7852460 hundredths

× 2.75 → × 275 hundredths

39262300
549672200
+ 157049200 0
2159426500 ten thousandths

215942.6500 = \$215,942.65

5. In the fifth grade at Lenape Elementary School, there are $\frac{4}{5}$ as many students who do not wear glasses as those who do wear glasses. If there are 60 students who wear glasses, how many students are in the fifth grade?



5 units = 60

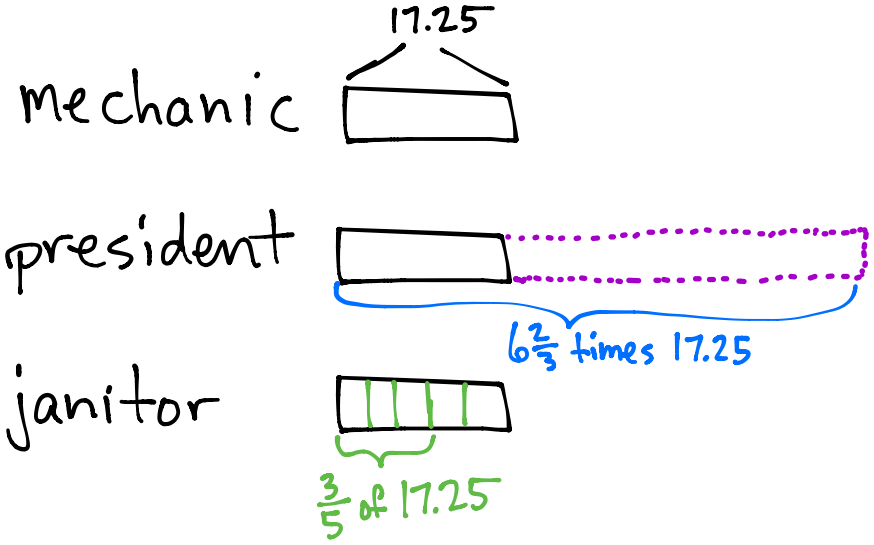
1 unit = 60 ÷ 5 = 12

9 units = 108

12 × 9 = 108

There are 108 5th grade students

6. At a factory, a mechanic earns \$17.25 an hour. The president of the company earns $6\frac{2}{3}$ times as much for each hour he works. The janitor at the same company earns $\frac{3}{5}$ as much as the mechanic. How much does the company pay for all three people employees' wages for one hour of work?



President

$6\frac{2}{3} \times 17.25$

$= 6\frac{2}{3} \times 17\frac{1}{4}$

$= \frac{20}{3} \times \frac{69}{4}$

$= \frac{5\ 20 \times 69\ 23}{1\ 3 \times 4\ 1}$

$= 115$

Janitor

$\frac{3}{5}$ of 17.25

$= \frac{3}{5} \times 17\frac{1}{4}$

$= \frac{3}{5} \times \frac{69}{4}$

$= \frac{207}{20}$

$= 10\frac{7}{20} = 10\frac{35}{100}$

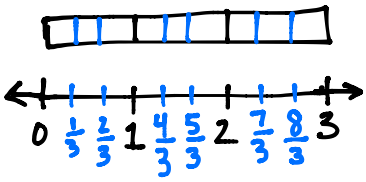
$= 10.35$

Total: 17.25 + 115 + 10.35 = 142.6 = \$142.60

Name _____ Date _____

1. Draw a tape diagram and a number line to solve. Fill in the blanks that follow.

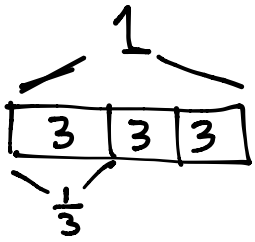
a. $3 \div \frac{1}{3} =$ 9



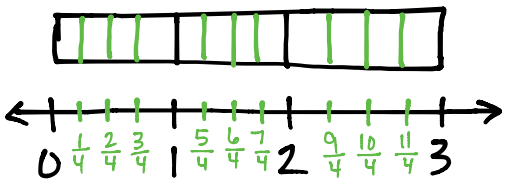
There are 3 thirds in 1 whole.

There are 9 thirds in 3 wholes.

If 3 is $\frac{1}{3}$, what is the whole? 9



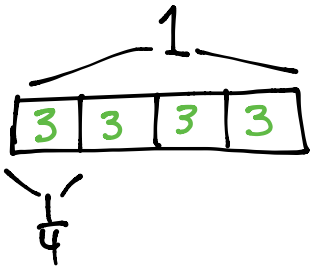
b. $3 \div \frac{1}{4} =$ 12



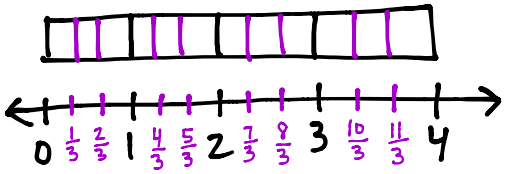
There are 4 fourths in 1 whole.

There are 12 fourths in 3 wholes.

If 3 is $\frac{1}{4}$, what is the whole? 12



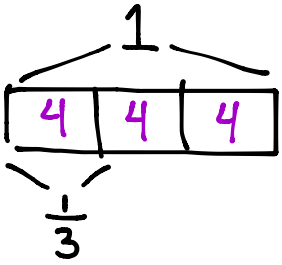
c. $4 \div \frac{1}{3} =$ 12



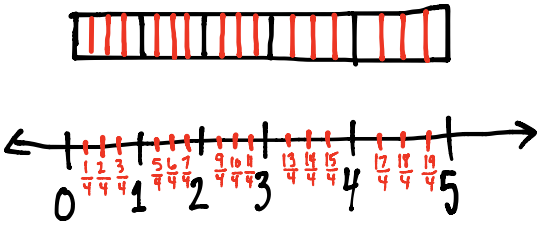
There are 3 thirds in 1 whole.

There are 12 thirds in 4 wholes.

If 4 is $\frac{1}{3}$, what is the whole? 12



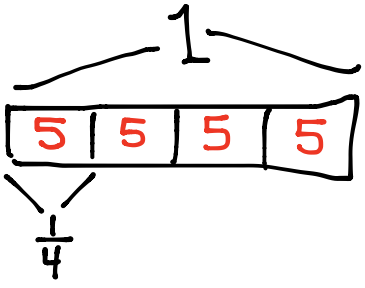
d. $5 \div \frac{1}{4} =$ 20



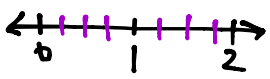
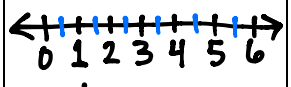
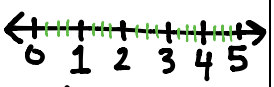
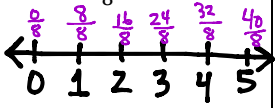
There are 4 fourths in 1 whole.

There are 20 fourths in 5 wholes.

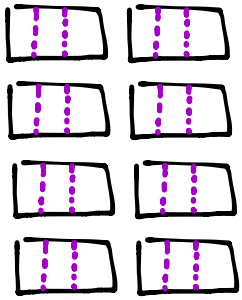
If 5 is $\frac{1}{4}$, what is the whole? 20



2. Divide. Then multiply to check.

a. $2 \div \frac{1}{4} = 8$  $2 \div \frac{1}{4} = 2 \times 4 = 8$ $8 \times \frac{1}{4} = \frac{8}{4} = 2$ ✓	b. $6 \div \frac{1}{2} = 12$  $6 \div \frac{1}{2} = 6 \times 2 = 12$ $12 \times \frac{1}{2} = \frac{12}{2} = 6$ ✓	c. $5 \div \frac{1}{4}$  $5 \div \frac{1}{4} = 5 \times 4 = 20$ $20 \times \frac{1}{4} = \frac{20}{4} = 5$ ✓	d. $5 \div \frac{1}{8}$  $5 \div \frac{1}{8} = 5 \times 8 = 40$ $40 \times \frac{1}{8} = \frac{40}{8} = 5$ ✓
e. $6 \div \frac{1}{3} = 18$ $6 \div \frac{1}{3} = 6 \times 3 = 18$ $18 \times \frac{1}{3} = \frac{18}{3} = 6$ ✓	f. $3 \div \frac{1}{6} = 18$ $3 \div \frac{1}{6} = 3 \times 6 = 18$ $18 \times \frac{1}{6} = \frac{18}{6} = 3$ ✓	g. $6 \div \frac{1}{5} = 30$ $6 \div \frac{1}{5} = 6 \times 5 = 30$ $30 \times \frac{1}{5} = \frac{30}{5} = 6$ ✓	h. $6 \div \frac{1}{10} = 60$ $6 \div \frac{1}{10} = 6 \times 10 = 60$ $60 \times \frac{1}{10} = \frac{60}{10} = 6$ ✓

3. A principal orders 8 sub sandwiches for a teachers' meeting. She cuts the subs into thirds and puts the mini-subs onto a tray. How many mini-subs are on the tray?



$8 \div \frac{1}{3} = 8 \times 3 = 24$

There will be 24 mini-subs on the tray.

4. Some students prepare 3 different snacks. They make $\frac{1}{8}$ pound bags of nut mix, $\frac{1}{4}$ pound bags of cherries, and $\frac{1}{6}$ pound bags of dried fruit. If they buy 3 pounds of nut mix, 5 pounds of cherries, and 4 pounds of dried fruit, how many of each type of snack bag will they be able to make?

Nut mix: $3 \div \frac{1}{8} = 3 \times 8 = 24$ 24 bags of nut mix.

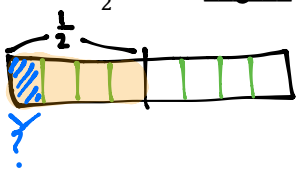
Cherries: $5 \div \frac{1}{4} = 5 \times 4 = 20$ 20 bags of cherries.

Dried fruit: $4 \div \frac{1}{10} = 4 \times 6 = 24$ 24 bags of dried fruit.

Name _____ Date _____

1. Solve and support your answer with a model or tape diagram. Write your quotient in the blank.

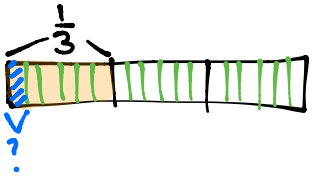
a. $\frac{1}{2} \div 4 =$ $\frac{1}{8}$



1 half ÷ 4
= 4 eighths ÷ 4
= 1 eighth

$\frac{1}{2} \div 4 = \frac{1}{8}$

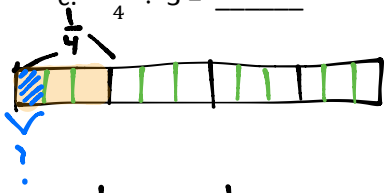
b. $\frac{1}{3} \div 6 =$ _____



1 third ÷ 6
= 6 eighteenths ÷ 6
= 1 eighteenth

$\frac{1}{3} \div 6 = \frac{1}{18}$

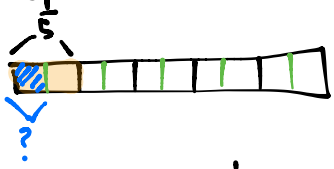
c. $\frac{1}{4} \div 3 =$ _____



1 fourth ÷ 3
= 3 twelfths ÷ 3
= 1 twelfth

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

d. $\frac{1}{5} \div 2 =$ _____



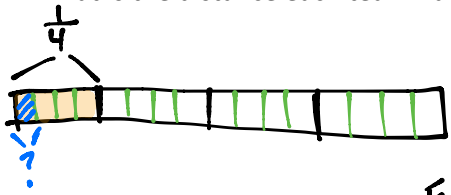
1 fifth ÷ 2
= 2 tenths ÷ 2
= 1 tenths

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

2. Divide. Then multiply to check.

a. $\frac{1}{2} \div 10$ $\frac{1}{2} \div 10 = \frac{1}{20}$ $\frac{1}{20} \times 10 = \frac{10}{20} = \frac{1}{2}$ ✓	b. $\frac{1}{4} \div 10$ $\frac{1}{4} \div 10 = \frac{1}{40}$ $\frac{1}{40} \times 10 = \frac{10}{40} = \frac{1}{4}$ ✓	c. $\frac{1}{3} \div 5$ $\frac{1}{3} \div 5 = \frac{1}{15}$ $\frac{1}{15} \times 5 = \frac{5}{15} = \frac{1}{3}$ ✓	d. $\frac{1}{5} \div 3$ $\frac{1}{5} \div 3 = \frac{1}{15}$ $\frac{1}{15} \times 3 = \frac{3}{15} = \frac{1}{5}$ ✓
e. $\frac{1}{8} \div 4$ $\frac{1}{8} \div 4 = \frac{1}{32}$ $\frac{1}{32} \times 4 = \frac{4}{32} = \frac{1}{8}$ ✓	f. $\frac{1}{7} \div 3$ $\frac{1}{7} \div 3 = \frac{1}{21}$ $\frac{1}{21} \times 3 = \frac{3}{21} = \frac{1}{7}$ ✓	g. $\frac{1}{10} \div 5$ $\frac{1}{10} \div 5 = \frac{1}{50}$ $\frac{1}{50} \times 5 = \frac{5}{50} = \frac{1}{10}$ ✓	h. $\frac{1}{5} \div 20$ $\frac{1}{5} \div 20 = \frac{1}{100}$ $\frac{1}{100} \times 20 = \frac{20}{100} = \frac{1}{5}$ ✓

3. Teams of four are competing in a quarter-mile relay race. Each runner must run the same exact distance. What is the distance each teammate runs?

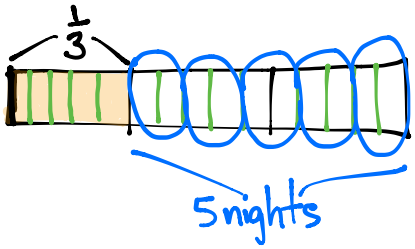


$\frac{1}{4} \div 4 = \frac{1}{16}$

Each runner will run $\frac{1}{16}$ mile.

4. Solomon has read $\frac{1}{3}$ of his book. He finishes the book by reading the same amount each night for 5 nights.

a. What fraction of the book does he read each of the 5 nights?

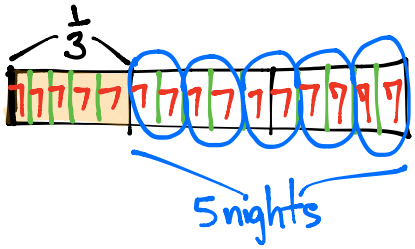


$\frac{1}{3} \div 5 = \frac{1}{15}$

10 fifteenths ÷ 5 = 2 fifteenths

Since Solomon must read 10 fifteenths in five nights, he needs to read 2 fifteenths each night.

b. If he reads 14 pages on each of the 5 nights, how long is the book?



If each night represents 14 pages, then each fifteenth is 7 pages.

1 unit = 7 pages
15 units = 105 pages

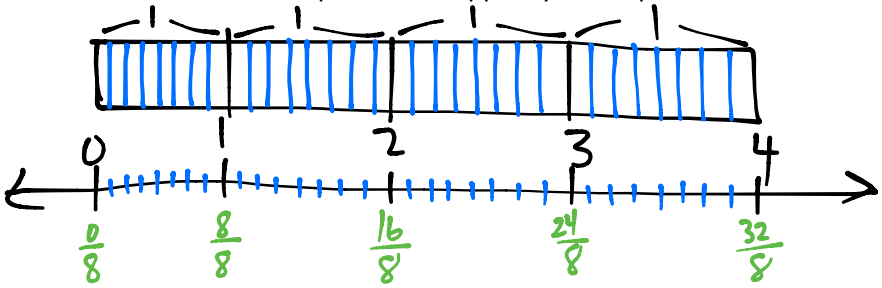
7 x 15 = 105

The book is 105 pages long.

NOTE: Each problem can be solved in a variety of ways. Here we only show one of the many possible ways.

Name _____ Date _____

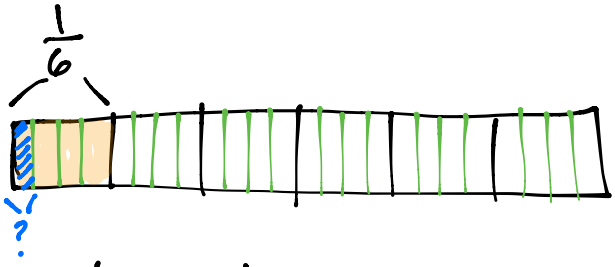
1. Kelvin ordered four pizzas for a birthday party. The pizzas were cut in eighths. How many slices were there? Draw a picture to support your response.



$4 \div \frac{1}{8} = 4 \times 8 = 32$

There are 32 slices.

2. Virgil has $\frac{1}{6}$ of a birthday cake left over. He wants to share the leftover cake with three friends. What fraction of the original cake will each of the 4 people receive? Draw a picture to support your response.

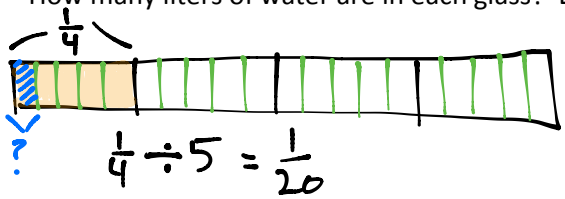


$\frac{1}{6} \div 4 = \frac{1}{24}$

$\frac{1}{6} \div 4$
= 4 twenty-fourths $\div$ 4
= 1 twenty-fourth

Each person will get $\frac{1}{24}$ of the original cake.

3. A pitcher of water contains $\frac{1}{4}$ L water. The water is poured equally into 5 glasses.
   a. How many liters of water are in each glass? Draw a picture to support your response.



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

Each glass will have $\frac{1}{20}$ liter.

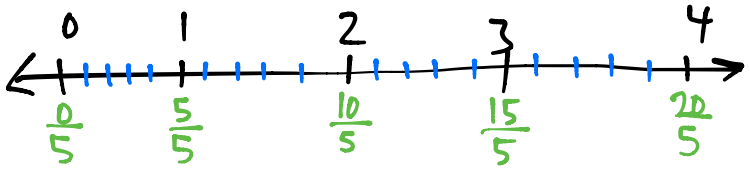
   b. Write the amount of water in each glass in milliliters.

$\frac{1}{20}$ liter $= \frac{1}{20} \times 1$ liter
$= \frac{1}{20} \times 1000$ milliliters
$= \frac{1 \times 1000}{20}$ milliliters
$= 50$ milliliters

$\frac{1}{20}$ liter = 50 milliliters

50 mL

4. Drew has 4 pieces of rope 1 meter long each. He cuts each rope into fifths.
   a. How many fifths will he have after cutting all the ropes?



$4 \div \frac{1}{5} = 4 \times 5 = 20$

Drew will have 20 fifths.

   b. How long will each of the fifths be in centimeters?

$\frac{1}{5}m = \frac{1}{5} \times 1m$

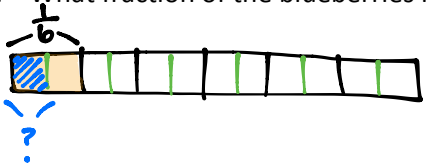
$= \frac{1}{5} \times 100\ cm$

$= \frac{1 \times 100}{5}\ cm$

$= 20\ cm$

$\frac{1}{5}m = 20\ cm$

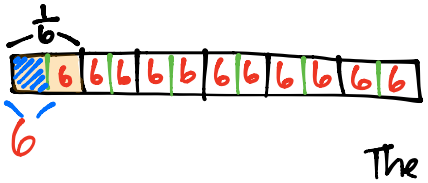
5. A container is filled with blueberries. $\frac{1}{6}$ of the blueberries are poured equally into two bowls.
   a. What fraction of the blueberries is in each bowl?



$\frac{1}{6} \div 2 = \frac{1}{12}$

Each bowl will have $\frac{1}{12}$ of the blueberries.

   b. If each bowl has 6 ounces of blueberries in it, how many ounces of blueberries were in the full container?



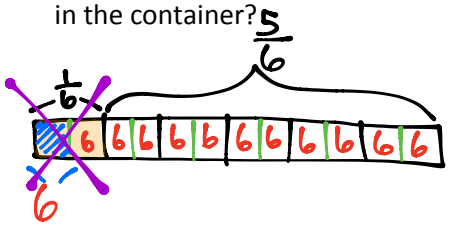
$\frac{1}{12} = 1\ unit = 6\ ounces$

$\frac{12}{12} = 12\ units = 72\ ounces$

$12 \times 6 = 72$

The full container had 72 ounces.

   c. If $\frac{1}{5}$ of the remaining blueberries are used to make muffins, how many pounds of blueberries are left in the container?



$\frac{1}{5}$ of $\frac{5}{6} = \frac{1}{5} \times \frac{5}{6} = \frac{1 \times 5}{5 \times 6} = \frac{1}{6}$

$\frac{1}{6}$ of the blue berries are used for muffins.

$\frac{5}{6} - \frac{1}{6} = \frac{4}{6}$

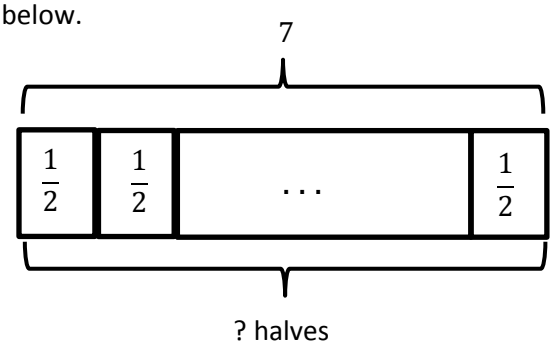
$\frac{4}{6}$ of the blue berries are left.

$\frac{4}{6}$ of $72 = \frac{4}{6} \times 72 = \frac{4 \times 72}{6} = 48\ oz = 3\ pounds$

NOTE: Clearly, students will create a wide variety of story problems. One sample is provided for each problem.

Name _____ Date _____

1. Create and solve a division story problem about 7 feet of rope that is modeled by the tape diagram below.

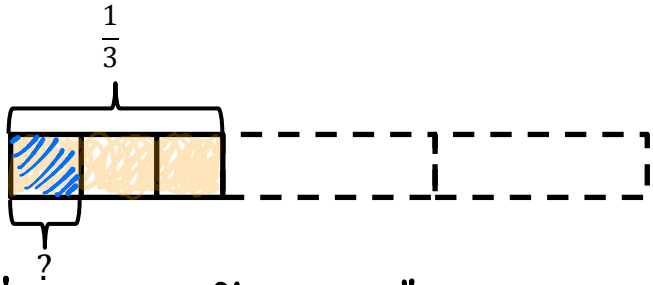


James has 7 feet of rope. He cuts it into equal lengths of $\frac{1}{2}$ foot each. How many pieces of rope will James have?

$7 \div \frac{1}{2} = 7 \times 2 = 14$

James will have 14 pieces of rope.

2. Create and solve a story problem about $\frac{1}{3}$ pound of flour that is modeled by the tape diagram below.



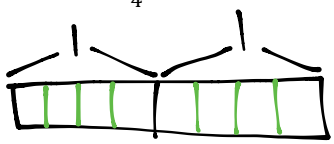
Jasmin poured $\frac{1}{3}$ pound of flour equally into 3 jars. How many pounds of flour will go into each jar?

$\frac{1}{3} \div 3 = \frac{1}{9}$

Each jar will have $\frac{1}{9}$ pound of flour.

3. Draw a tape diagram and create a word problem for the following expressions. Then solve and check.

a. $2 \div \frac{1}{4}$



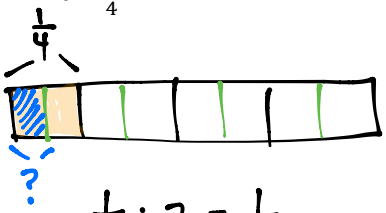
$2 \div \frac{1}{4} = 2 \times 4 = 8$

Check: $8 \times \frac{1}{4} = \frac{8}{4} = 2$ ✓

Martin has 2 cupcakes and cuts each one into fourths. How many pieces will he have altogether?

ANSWER: Martin will have 8 pieces.

b. $\frac{1}{4} \div 2$



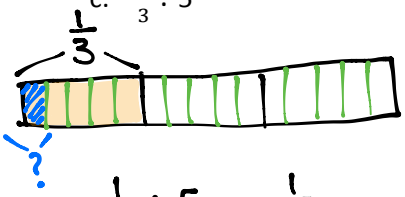
$\frac{1}{4} \div 2 = \frac{1}{8}$

Check: $\frac{1}{8} \times 2 = \frac{2}{8} = \frac{1}{4}$ ✓

Abigail has $\frac{1}{4}$ of a pizza and wants to share it equally with her friend. What fraction of a full pizza will each of the 2 girls get?

ANSWER: Each girl will get $\frac{1}{8}$ of a pizza.

c. $\frac{1}{3} \div 5$



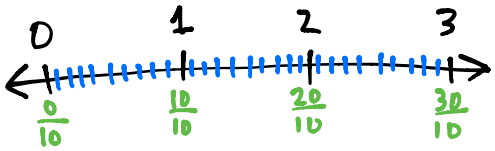
$\frac{1}{3} \div 5 = \frac{1}{15}$

Check: $\frac{1}{15} \times 5 = \frac{5}{15} = \frac{1}{3}$ ✓

Timothy has $\frac{1}{3}$ pound of salami and wants to divide it equally to make 5 sandwiches. How much salami will go on each sandwich?

ANSWER: Each sandwich will have $\frac{1}{15}$ pound of salami.

d. $3 \div \frac{1}{10}$



$3 \div \frac{1}{10} = 3 \times 10 = 30$

Check: $30 \times \frac{1}{10} = \frac{30}{10} = 3$ ✓

Heather is jogging on a track that is $\frac{1}{10}$ km long. If she wants to jog 3 kilometers, how many times will Heather have to go around the track?

ANSWER: She will need to go around the track 30 times.

Name _____ Date _____

1. Divide. Rewrite each expression as a division sentence with a fraction divisor, and fill in the blanks. The first one is done for you.

Example: $4 \div 0.1 = 4 \div \frac{1}{10} = 40$

There are 10 tenths in 1 whole.

There are 40 tenths in 4 wholes.

a. $9 \div 0.1 =$ 90

There are 10 tenths in 1 whole.

There are 90 tenths in 9 wholes.

b. $6 \div 0.1 =$ 60

There are 10 tenths in 1 whole.

There are 60 tenths in 6 wholes.

c. $3.6 \div 0.1 =$ 36

There are 30 tenths in 3 wholes.

There are 6 tenths in 6 tenths.

There are 36 tenths in 3.6.

d. $12.8 \div 0.1 =$ 128

There are 120 tenths in 12 wholes.

There are 8 tenths in 8 tenths.

There are 128 tenths in 12.8.

e. $3 \div 0.01 =$ 300

There are 100 hundredths in 1 whole.

There are 300 hundredths ~~tenths~~ in 3 wholes.

f. $7 \div 0.01 =$ 700

There are 100 hundredths in 1 whole.

There are 700 hundredths in 7 wholes.

g. $4.7 \div 0.01 =$ 470

There are 400 hundredths in 4 wholes.

There are 70 hundredths in 7 tenths.

There are 470 hundredths in 4.7.

h. $11.3 \div 0.01 =$ 1130

There are 1100 hundredths in 11 wholes.

There are 30 hundredths in 3 tenths.

There are 1130 hundredths in 11.3.

2. Divide.

a. $2 \div 0.1$ $2 \div \frac{1}{10} = 2 \times 10$ $= 20$	b. $23 \div 0.1$ $23 \div \frac{1}{10} = 23 \times 10$ $= 230$	c. $5 \div 0.01$ $5 \div \frac{1}{100} = 5 \times 100$ $= 500$
d. $7.2 \div 0.1$ $7.2 \div \frac{1}{10} = 7.2 \times 10$ $= 72$	e. $51 \div 0.01$ $51 \div \frac{1}{100} = 51 \times 100$ $= 5{,}100$	f. $31 \div 0.1$ $31 \div \frac{1}{10} = 31 \times 10$ $= 310$
g. $231 \div 0.1$ $231 \div \frac{1}{10} = 231 \times 10$ $= 2{,}310$	h. $4.37 \div 0.01$ $4.37 \div \frac{1}{100} = 437 \times 100$ $= 437$	i. $24.5 \div 0.01$ $24.5 \div \frac{1}{100}$ $= 24.5 \times 100$ $= 2{,}450$

3. Giovanna is charged \$0.01 for each text message she sends. Last month her cell phone bill included a \$12.60 charge for text messages. How many text messages did Giovanna send?

$12.60 \div 0.01 = 12.60 \div \frac{1}{100} = 12.60 \times 100 = 1{,}260$

Giovanna sent 1,260 text messages.

4. Geraldine solved a problem: $68.5 \div 0.01 = 6{,}850$.
Ralph said, "This is wrong because a quotient can't be greater than the whole you start with. For example, $8 \div 2 = 4$, and $250 \div 5 = 50$." Who is correct? Explain your thinking.

Geraldine is correct. Since she is dividing by a number smaller than 1, but larger than zero, the quotient will get bigger.

5. The price for an ounce of gold on September 23, 2013, was \$1,326.40. A group of 10 friends decide to share the cost equally on 1 ounce of gold. How much money will each friend pay?

$1326.40 \div 10 = 132.64$

Each friend will pay \$132.64.

Name _____ Date _____

1. Rewrite the division expression as a fraction, and divide. The first two have been started for you.

a. $2.4 \div 0.8 = \frac{2.4}{0.8}$ $= \frac{2.4 \times 10}{0.8 \times 10}$ $= \frac{24}{8}$ $= 3$	b. $2.4 \div 0.08 = \frac{2.4}{0.08}$ $= \frac{2.4 \times 100}{0.08 \times 100}$ $= \frac{240}{8}$ $= 30$
c. $4.8 \div 0.6 = \frac{4.8}{0.6}$ $= \frac{4.8 \times 10}{0.6 \times 10}$ $= \frac{48}{6} = 8$	d. $0.48 \div 0.06 = \frac{0.48}{0.06}$ $= \frac{0.48}{0.06} \times \frac{100}{100}$ $= \frac{48}{6} = 8$
e. $8.4 \div 0.7 = \frac{8.4}{0.7}$ $= \frac{8.4}{0.7} \times \frac{10}{10}$ $= \frac{84}{7}$ $= 12$	f. $0.84 \div 0.07 = \frac{0.84}{0.07}$ $= \frac{0.84}{0.07} \times \frac{100}{100}$ $= \frac{84}{7}$ $= 12$
g. $4.5 \div 1.5 = \frac{4.5}{1.5}$ $= \frac{4.5}{1.5} \times \frac{10}{10}$ $= \frac{45}{15}$ $= 3$	h. $0.45 \div 0.15 = \frac{0.45}{0.15}$ $= \frac{0.45}{0.15} \times \frac{100}{100}$ $= \frac{45}{15}$ $= 3$

i. $14.4 \div 1.2 = \frac{14.4}{1.2}$ $= \frac{14.4}{1.2} \times \frac{10}{10}$ $= \frac{144}{12} = 12$	j. $1.44 \div 0.12 = \frac{1.44}{0.12}$ $= \frac{1.44}{0.12} \times \frac{100}{100}$ $= \frac{144}{12} = 12$

2. Leann says 18 ÷ 6 = 3, so 1.8 ÷ 0.6 = 0.3 and 0.18 ÷ 0.06 = 0.03. Is Leann correct? How would you explain how to solve these division problems?

$18 \div 6 = \frac{18}{6}$
$= 3$

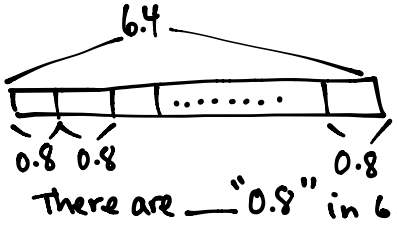
$1.8 \div 0.6 = \frac{1.8}{0.6}$
$= \frac{1.8}{0.6} \times \frac{10}{10}$
$= \frac{18}{6} = 3$

$0.18 \div 0.06 = \frac{0.18}{0.06}$
$= \frac{0.18}{0.06} \times \frac{100}{100}$
$= \frac{18}{6}$
$= 3$

Leann is incorrect. All three division problems are equivalent to $\frac{18}{6}$, so their quotient is 3.

3. Denise is making bean bags. She has 6.4 pounds of beans.

a. If she makes each bean bag 0.8 pounds, how many bean bags will she be able to make?



$6.4 \div 0.8 = \frac{6.4}{0.8}$
$= \frac{6.4}{0.8} \times \frac{10}{10} = \frac{64}{8} = 8$

She will be able to make 8 bean bags.

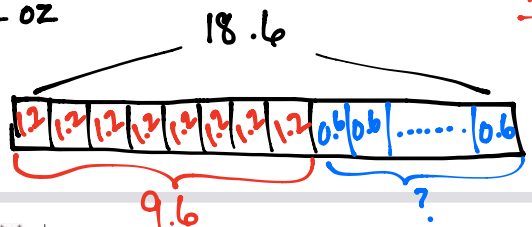
b. If she decides instead to make mini bean bags that are half as heavy, how many can she make?

$6.4 \div 0.4 = \frac{6.4}{0.4}$
$= \frac{6.4}{0.4} \times \frac{10}{10} = \frac{64}{4} = 16$

She will be able to make twice as many, which is 16 bean bags.

4. A restaurant's small salt shakers contain 0.6 ounces of salt. Its large shakers hold twice as much. The shakers are filled from a container that has 18.6 ounces of salt. If 8 large shakers are filled, how many small shakers can be filled with the remaining salt?

Small = 0.6 oz
Large = 1.2 oz



$1.2 \times 8 = 9.6$

$18.6 - 9.6 = 9.0$

$9.0 \div 0.6$
$= \frac{9.0}{0.6}$
$= \frac{9.0}{0.6} \times \frac{10}{10} = \frac{90}{6} = 15$

15 small shakers

Name _____ Date _____

1. Estimate, then divide. An example has been done for you.

$78.4 \div 0.7 \approx 770 \div 7 = 110$

$= \frac{78.4}{0.7}$

$= \frac{78.4 \times 10}{0.7 \times 10}$

$= \frac{784}{7}$

$= 112$

$$\begin{array}{r} 1\,1\,2 \\ 7\overline{)\,7\,8\,4} \\ -7 \\ \hline 8 \\ -7 \\ \hline 1\,4 \\ -1\,4 \\ \hline 0 \end{array}$$

a. $61.6 \div 0.8 = \frac{61.6}{0.8} \approx \frac{640}{8} = 80$

$= \frac{61.6}{0.8} \times \frac{10}{10}$

$= \frac{616}{8}$

$= 77$

$$\begin{array}{r} 77 \\ 8\overline{)616} \\ -56 \\ \hline 56 \\ -56 \\ \hline 0 \end{array}$$

b. $5.74 \div 0.7 = \frac{5.74}{0.7} \approx \frac{56}{7} = 8$

$= \frac{5.74}{0.7} \times \frac{10}{10}$

$= \frac{57.4}{7}$

$= 8.2$

$$\begin{array}{r} 8.2 \\ 7\overline{)57.4} \\ -56 \\ \hline 14 \\ -14 \\ \hline 0 \end{array}$$

2. Estimate, then divide. An example has been done for you.

$7.32 \div 0.06 = \frac{7.32}{0.06} \approx 720 \div 6 = 120$

$= \frac{7.32 \times 100}{0.06 \times 100}$

$= \frac{732}{6}$

$= 122$

$$\begin{array}{r} 1\,2\,2 \\ 6\overline{)\,7\,3\,2} \\ -6 \\ \hline 1\,3 \\ -1\,2 \\ \hline 1\,2 \\ -1\,2 \\ \hline 0 \end{array}$$

a. $4.74 \div 0.06 = \frac{4.74}{0.06} \approx \frac{480}{6} = 80$

$= \frac{4.74}{0.06} \times \frac{100}{100}$

$= \frac{474}{6}$

$= 79$

$$\begin{array}{r} 79 \\ 6\overline{)474} \\ -42 \\ \hline 54 \\ -54 \\ \hline 0 \end{array}$$

b. $19.44 \div 0.54 = \frac{19.44}{0.54} \approx \frac{200}{5} = 40$

$= \frac{19.44}{0.54} \times \frac{100}{100}$

$= \frac{1944}{54}$

$= 36$

$$\begin{array}{r} 36 \\ 54\overline{)1944} \\ -162 \\ \hline 324 \\ -324 \\ \hline 0 \end{array}$$

3. Solve using the standard algorithm. Use the thought bubble to show your thinking as you rename the divisor as a whole number.

a. 38.4 ÷ 0.6 = 64

$= \frac{38.4}{0.6} = \frac{384}{6}$

$6\overline{)384}$ 64, −36, 24

b. 7.52 ÷ 0.08 = 94

$\frac{7.52}{0.08} = \frac{752}{8}$

$8\overline{)752}$ 94, −72, 32, −32, 0

c. 12.45 ÷ 0.5 = 24.9

$\frac{12.45}{0.5} = \frac{124.5}{5}$

$5\overline{)124.5}$ 24.9, −10, 24, −20, 45, −45, 0

d. 5.6 ÷ 0.16 = 35

$\frac{5.6}{0.16} = \frac{560}{16}$

$16\overline{)560}$ 35, −48, 80, −80, 0

4. Lucia is making a 21.6 centimeter beaded string to hang in the window. She decides to put a green bead every 0.4 centimeters and a purple bead every 0.6 centimeters. How many green beads and how many purple beads will she need?

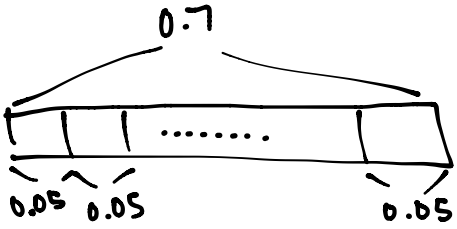
$21.6 \div 0.4 = \frac{21.6}{0.4} \times \frac{10}{10} = \frac{216}{4} = 54$ green beads

$21.6 \div 0.6 = \frac{21.6}{0.6} \times \frac{10}{10} = \frac{216}{6} = 36$ purple beads

She will need 54 green beads + 36 purple beads.

NOTE: While this is the "correct" answer, it doesn't make sense because at 1.2 cm, 2.4 cm, etc. both beads would be at the same location.

5. A group of 14 friends collects 0.7 pound of blueberries and decides to make blueberry muffins. They put 0.05 pound of berries in each muffin. How many muffins can they make if they use all the blueberries they collected?



$0.7 \div 0.05 = \frac{0.7}{0.05} = \frac{0.7}{0.05} \times \frac{100}{100} = \frac{70}{5} = 14$

They will be able to make 14 muffins.

Name _____ Date _____

1. Circle the expression equivalent to "the difference between 7 and 4, divided by a fifth."

$7 + (4 \div \frac{1}{5})$ $\frac{7-4}{5}$ $(7 - 4) \div \frac{1}{5}$ $\frac{1}{5} \div (7 - 4)$

2. Circle the expression(s) equivalent to "42 divided by the sum of $\frac{2}{3}$ and $\frac{3}{4}$."

$(\frac{2}{3}+\frac{3}{4}) \div 42$ $(42 \div \frac{2}{3}) + \frac{3}{4}$ $42 \div (\frac{2}{3}+\frac{3}{4})$ $\frac{42}{\frac{2}{3}+\frac{3}{4}}$

3. Fill in the chart by writing the equivalent numerical expression or expression in word form.

	Expression in word form	Numerical expression
a.	A fourth as much as the sum of $3\frac{1}{8}$ and 4.5	$\frac{1}{4} \times (3\frac{1}{8} + 4.5)$
b.	The sum of $3\frac{1}{8}$ and 4.5 divided by 5.	$(3\frac{1}{8} + 4.5) \div 5$
c.	Multiply $\frac{3}{5}$ by 5.8, then halve the product	$(\frac{3}{5} \times 5.8) \div 2$
d.	$\frac{1}{6}$ as much as the difference between 4.8 and $\frac{1}{2}$.	$\frac{1}{6} \times (4.8 - \frac{1}{2})$
e.	The difference between 8 and the quotient of $\frac{1}{2}$ and 9.	$8 - (\frac{1}{2} \div 9)$

4. Compare the expressions in 3(a)and 3(b). Without evaluating, identify the expression that is greater. Explain how you know.

3(a) is bigger because both expressions have $(3\frac{1}{8} + 4.5)$ but 3(b) divides it by 5, while 3(a) only divides it by 4. This makes 3(a) bigger.

5. Evaluate the following expressions.

a. $(11-6)\div\frac{1}{6}$

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

$= 5 \times 6$

$= 30$

b. $\frac{9}{5}\times(4\times\frac{1}{6})$

$= \frac{9}{5} \times \frac{4}{6}$

$= \frac{36}{30} = 1\frac{6}{30}$

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

c. $\frac{1}{10}\div(5\div\frac{1}{2})$

$= \frac{1}{10} \div (5 \times 2)$

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

$= \frac{1}{100}$

d. $\frac{3}{4}\times\frac{2}{5}\times\frac{4}{3}$

$= \frac{3\times2\times4}{4\times5\times3}$

$= \frac{3\times2\times4}{4\times5\times3}$

$= \frac{2}{5}$

e. 50 divided by the difference between $\frac{3}{4}$ and $\frac{5}{8}$

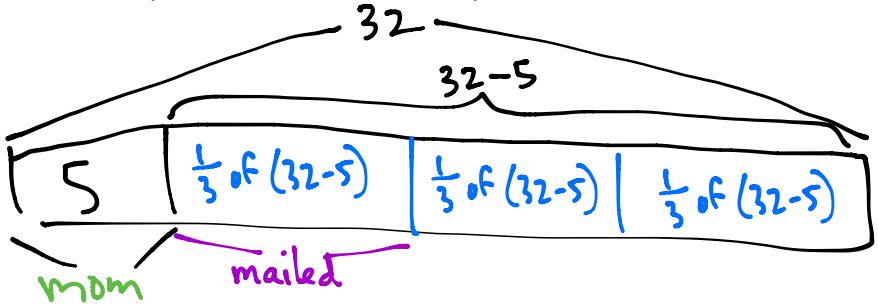
$\frac{50}{\frac{3}{4}-\frac{5}{8}} = \frac{50}{\frac{6}{8}-\frac{5}{8}} = \frac{50}{\frac{1}{8}}$

$50 \div \frac{1}{8} = 50 \times 8 = 400$

6. Lee is sending out 32 birthday party invitations. She gives 5 invitations to her mom to give to family members. Lee mails a third of the rest, and then she takes a break to walk her dog.

a. Write a numerical expression to describe how many invitations Lee has already mailed.

$(32-5)\div3$



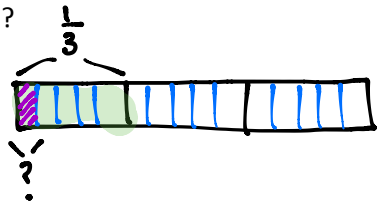
b. Which expression matches how many invitations still need to be sent out?

$32-5-\frac{1}{3}(32-5)$ $\quad \frac{2}{3}\times32-5$ $\quad (32-5)\div\frac{1}{3}$ $\quad \frac{1}{3}\times(32-5)$

Name _____ Date _____

1. Chase volunteers at an animal shelter after school, feeding and playing with the cats.

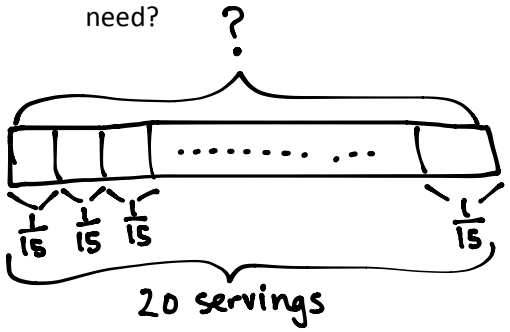
   a. If he can make 5 servings of cat food from a third of a kilogram of food, how much does one serving weigh?



$\frac{1}{3} \div 5 = \frac{1}{15}$

One serving weighs $\frac{1}{15}$ kg.

   b. If Chase wants to give this same serving size to each of 20 cats, how many kilograms of food will he need?



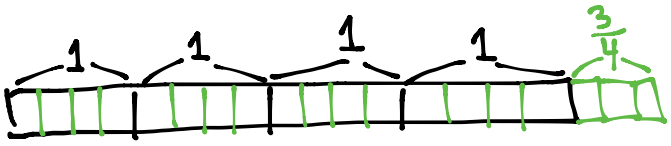
$20 \times \frac{1}{15} = \frac{20}{15} = \frac{4}{3} = 1\frac{1}{3}$

Chase will need $1\frac{1}{3}$ kg of food.

2. Anouk has 4.75 pounds of meat. She uses a quarter pound of meat to make one hamburger.

   a. How many hamburgers can Anouk make with the meat she has?

$4.75 \div \frac{1}{4} = 4\frac{3}{4} \div \frac{1}{4}$



4 fourths in 1 whole

16 fourths in 4 wholes

3 fourths in $\frac{3}{4}$.

19 fourths in $4\frac{3}{4}$

She can make 19 hamburgers

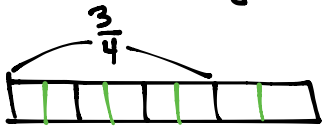
   b. Sometimes Anouk makes sliders. Each slider is half as much meat as is used for a regular hamburger. How many sliders could Anouk make with the 4.75 pounds?

$4.75 \div \frac{1}{8} = 4\frac{3}{4} \div \frac{1}{8}$

$4 \div \frac{1}{8} = 4 \times 8 = 32$

$\frac{3}{4} \div \frac{1}{8} = 6$

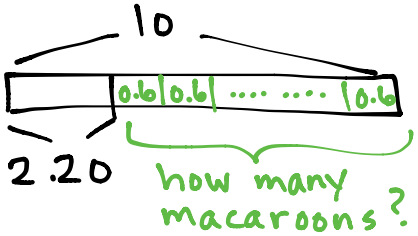
$4\frac{3}{4} \div \frac{1}{8} = 38$



She can make 38 sliders.

3. Ms. Geronimo has a $10 gift certificate to her local bakery.

   a. If she buys a slice of pie for $2.20 and uses the rest of the gift certificate to buy chocolate macaroons that cost $0.60 each, how many macaroons can Ms. Geronimo buy?



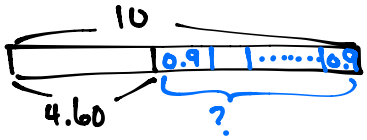
$10.00 - 2.20 = 7.80$

$7.80 \div 0.60 = \frac{7.80}{0.60} = \frac{7.80}{0.60} \times \frac{10}{10} = \frac{78}{6} = 13$

She can buy 13 macaroons.

   b. If she changes her mind and instead buys a loaf of bread for $4.60 and uses the rest to buy cookies that cost $1\frac{1}{2}$ times as much as the macaroons, how many cookies can she buy?

$1\frac{1}{2} \times 0.60 = 0.90$



$10.00 - 4.60 = 5.40$

$5.40 \div 0.90 = \frac{5.40}{0.90} = \frac{5.40}{0.90} \times \frac{10}{10} = \frac{54}{9} = 6$

She can buy 6 cookies.

4. Create a story context for the following expressions.

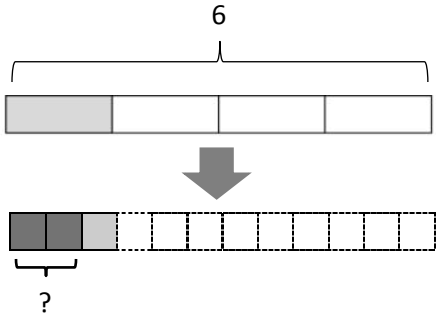
   a. $(5\frac{1}{4} - 2\frac{1}{8}) \div 4$

Joe has $5\frac{1}{4}$ pound of flour and uses $2\frac{1}{8}$ pound to make a pizza. He puts the remaining flour into four jars. How much flour is in each jar?

   b. $4 \times (\frac{4.8}{0.8})$

Macaroons cost $0.80. Four days in a row Marta spends $4.80 each day buying as many macaroons as she can. How many macaroons will she buy altogether?

5. Create a story context for the following tape diagram.



Lisa took her $6 and divided it equally into 4 envelopes. She then spent $\frac{2}{3}$ of the money in one envelope on ear rings. How much money did Lisa spend?