Name ______________________________ Date ______________

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?

b. Which location received the least rainfall?

c. Which rainfall measurement was the most frequent?

d. What is the total rainfall in inches?

Name ______________________________ Date ________________

1. Draw a picture to show the division. Write a division expression using unit form. Then, express your answer as a fraction. The first one is partially done for you.

   a. 1 ÷ 5 = 5 fifths ÷ 5 = 1 fifth = $\frac{1}{5}$

   b. 3 ÷ 4

   c. 6 ÷ 4

2. Draw to show how 2 children can equally share 3 cookies. Write an equation, and express your answer as a fraction.

Name ____ Date ________________________

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

   a. $1 \div 4$

   b. $3 \div 5$

   c. $7 \div 4$

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

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

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

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

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

d. $\frac{9}{5}$ = _______ ÷ _______

e. $\frac{19}{28}$ = _______ ÷ _______

f. $1\frac{3}{5}$ = _______ ÷ _______

Name ______________________________ Date ________________

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

Division Expression	Unit Forms	Improper Fraction	Mixed Numbers	Standard Algorithm (Write your answer in whole numbers and fractional units. Then check.)
a. 5 ÷ 4	20 fourths ÷ 4 = 5 fourths	$\frac{5}{4}$	$1\frac{1}{4}$	$4\overline{)5}$ with quotient $1\frac{1}{4}$; -4; remainder 1 Check $4 \times 1\frac{1}{4} = 1\frac{1}{4} + 1\frac{1}{4} + 1\frac{1}{4} + 1\frac{1}{4}$ $= 4 + \frac{4}{4}$ $= 4 + 1$ $= 5$
b. 3 ÷ 2	___ halves ÷ 2 = ___ halves		$1\frac{1}{2}$	
c. ___ ÷ ___	24 fourths ÷ 4 = 6 fourths			$4\overline{)6}$
d. 5 ÷ 2		$\frac{5}{2}$	$2\frac{1}{2}$	

2. A principal evenly distributes 6 reams of copy paper to 8 fifth-grade teachers.

   a. How many reams of paper does each fifth-grade teacher receive? Explain how you know using pictures, words, or numbers.

   b. If there were twice as many reams of paper and half as many teachers, how would the amount each teacher receives change? Explain how you know using pictures, words, or numbers.

3. A caterer has prepared 16 trays of hot food for an event. The trays are placed in warming boxes for delivery. Each box can hold 5 trays of food.

   a. How many warming boxes are necessary for delivery if the caterer wants to use as few boxes as possible? Explain how you know.

   b. If the caterer fills a box completely before filling the next box, what fraction of the last box will be empty?

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 ÷ 3	12 thirds ÷ 3 = 4 thirds	$\frac{4}{3}$	$1\frac{1}{3}$	$3\overline{)4}$ quotient $1\frac{1}{3}$; $4 - 3 = 1$ 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. ___ ÷ ___	___ fifths ÷ 5 = ___ fifths		$1\frac{2}{5}$	
c. ___ ÷ ___	___ halves ÷ 2 = ___ halves			$2\overline{)7}$
d. 7 ÷ 4		$\frac{7}{4}$		

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

   a. If there are 15 liters of milk in the refrigerator, after how many days will more milk need to be purchased? Explain how you know.

   b. If only half as much milk is used each day, after how many days will more milk need to be purchased?

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

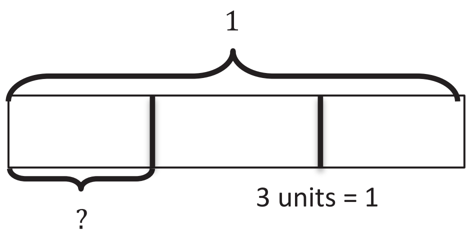
   a. How many boxes will be needed for Polly to bring all the cupcakes to the party? Explain how you know.

   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?

Name ____ Date ______________________

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

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



3 units = 1

1 unit = 1 ÷ 3

$= \frac{1}{3}$

$$\begin{array}{r|l} & 0\ \tfrac{1}{3} \\ \hline 3 & 1 \\ & -0 \\ \hline & 1 \end{array}$$

Check: $3 \times \frac{1}{3}$

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

$= \frac{3}{3}$

$= 1$

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

   c. $7 \div 5 = \frac{}{}$

   d. $14 \div 5 = \frac{}{}$

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. $13 \div 3$	$\frac{13}{3}$	4 and 5	$\begin{array}{r\|l} & 4\ \frac{1}{3} \\ \hline 3 & 13 \\ & -12 \\ \hline & 1 \end{array}$
b. $6 \div 7$		0 and 1	$7 \overline{)\ 6}$
c. ____÷____	$\frac{55}{10}$		
d. ____÷____	$\frac{32}{40}$		$40 \overline{)\ 32}$

3. Greg spent $4 on 5 packs of sport cards.

   a. How much did Greg spend on each pack?

   b. If Greg spent half as much money and bought twice as many packs of cards, how much did he spend on each pack? Explain your thinking.

4. Five pounds of birdseed is used to fill 4 identical bird feeders.

   a. What fraction of the birdseed will be needed to fill each feeder?

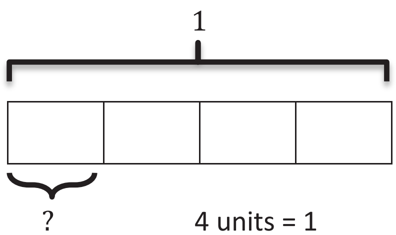
   b. How many pounds of birdseed are used to fill each feeder? Draw a tape diagram to show your thinking.

   c. How many ounces of birdseed are used to fill three bird feeders?

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

$= \frac{1}{4}$

$$\begin{array}{r|l} & 0\ \frac{1}{4} \\ \hline 4 & 1 \\ & -\ 0 \\ \hline & 1 \end{array}$$

Check:

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

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

$$= \frac{4}{4}$$

$$= 1$$

b. $4 \div 5 = \frac{\ }{\ }$

c. $8 \div 5 = \frac{\ }{\ }$

d. $14 \div 3 = \frac{\ }{\ }$

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. ____÷____	$\frac{3}{4}$	0 and 1	
c. ____÷____	$\frac{7}{2}$		$2 \overline{)7}$
d. ____÷____	$\frac{81}{90}$		

3. Jackie cut a 2-yard spool into 5 equal lengths of ribbon.

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

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

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

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.

Name ____ Date ______________________

1. A total of 2 yards of fabric is used to make 5 identical pillows. How much fabric is used for each pillow?

2. An ice cream shop uses 4 pints of ice cream to make 6 sundaes. How many pints of ice cream are used for each sundae?

3. An ice cream shop uses 6 bananas to make 4 identical sundaes. How many bananas are used in each sundae? Use a tape diagram to show your work.

4. Julian has to read 4 articles for school. He has 8 nights to read them. He decides to read the same number of articles each night.

   a. How many articles will he have to read per night?

   b. What fraction of the reading assignment will he read each night?

5. 40 students shared 5 pizzas equally. How much pizza will each student receive? What fraction of the pizza did each student receive?

6. Lillian had 2 two-liter bottles of soda, which she distributed equally between 10 glasses.

   a. How much soda was in each glass? Express your answer as a fraction of a liter.

b. Express your answer as a decimal number of liters.

c. Express your answer as a whole number of milliliters.

7. The Calef family likes to paddle along the Susquehanna River.

   a. They paddled the same distance each day over the course of 3 days, traveling a total of 14 miles. How many miles did they travel each day? Show your thinking in a tape diagram.

   b. If the Calefs went half their daily distance each day but extended their trip to twice as many days, how far would they travel?

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?

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

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

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

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.

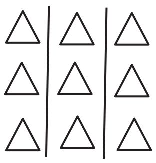
   b. How long, in feet, is one of Craig's sandwiches?

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

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.

Name ______________________________ Date ________________

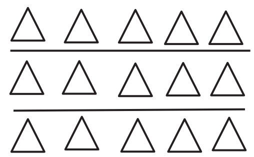
1. Find the value of each of the following.

a. 

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

$\frac{2}{3}$ of 9 =

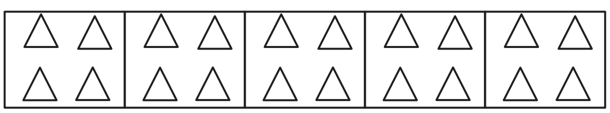
$\frac{3}{3}$ of 9 =

b. 

$\frac{1}{3}$ of 15 =

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

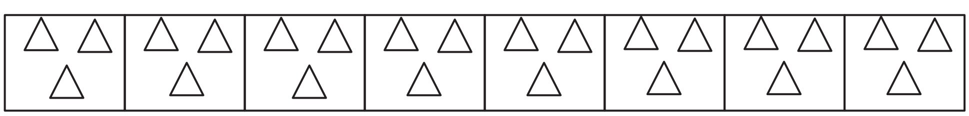
$\frac{3}{3}$ of 15 =

c. 

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

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

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

d. 

$\frac{1}{8}$ of 24 =

$\frac{6}{8}$ of 24 =

$\frac{3}{8}$ of 24 =

$\frac{7}{8}$ of 24 =

$\frac{4}{8}$ of 24 =

2. Find $\frac{4}{7}$ of 14. Draw a set, and shade to show your thinking.

3. How does knowing $\frac{1}{8}$ of 24 help you find three-eighths of 24? Draw a picture to explain your thinking.

4. There are 32 students in a class. Of the class, $\frac{3}{8}$ of the students bring their own lunches. How many students bring their lunches?

5. Jack collected 18 ten-dollar bills while selling tickets for a show. He gave $\frac{1}{6}$ of the bills to the theater and kept the rest. How much money did he keep?

Name ______________________________ Date ______________

1. Find the value of each of the following.

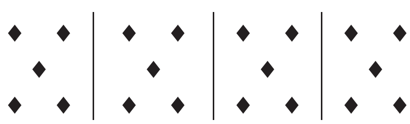
a.

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

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

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

b.



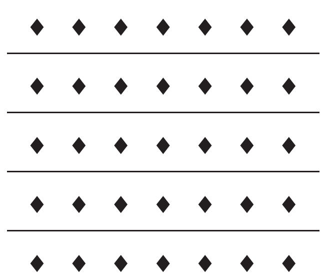
$\frac{1}{4}$ of 20 =

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

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

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

c.



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

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

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

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

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

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

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

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

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

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

   a. How many dozen eggs did the farmer give away? How many eggs did she give away?

   b. She sold each dozen for $4.50. How much did she earn from the eggs she sold?

Name ________________________________ Date ________________

1. Solve.

a. $\frac{1}{3}$ of 18

b. $\frac{1}{3}$ of 36

c. $\frac{3}{4} \times 24$

d. $\frac{3}{8} \times 24$

e. $\frac{4}{5} \times 25$

f. $\frac{1}{7} \times 140$

g. $\frac{1}{4} \times 9$

h. $\frac{2}{5} \times 12$

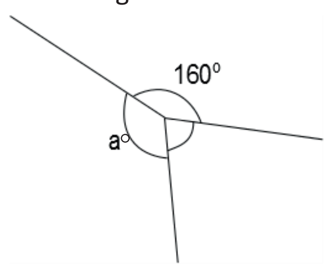
i. $\frac{2}{3}$ of a number is 10. What's the number?

j. $\frac{3}{4}$ of a number is 24. What's the number?

2. Solve.

   a. There are 48 students going on a field trip. One-fourth are girls. How many boys are going on the trip?

   b. Three angles are labeled below with arcs. The smallest angle is $\frac{3}{8}$ as large as the 160° angle. Find the value of angle a.



   c. Abbie spent $\frac{5}{8}$ of her money and saved the rest. If she spent $45, how much money did she have at first?

   d. Mrs. Harrison used 16 ounces of dark chocolate while baking. She used $\frac{2}{5}$ of the chocolate to make some frosting and used the rest to make brownies. How much more chocolate did Mrs. Harrison use in the brownies than in the frosting?

Name ______________________________ Date ________________

1. Solve.

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

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

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

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

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

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

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

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

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

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

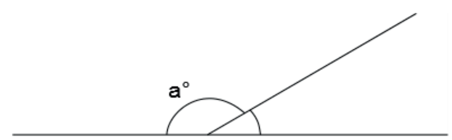
k. $\frac{3}{4}$ of a number is 27. What's the number?

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

2. Solve.

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



   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?

   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?

Name ____ Date ______________________

1. Laura and Sean find the product of $\frac{2}{3} \times 4$ using different methods.

Laura: It's 2 thirds of 4.

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

Sean: It's 4 groups of 2 thirds.

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

Use words, pictures, or numbers to compare their methods in the space below.

2. Rewrite the following addition expressions as fractions as shown in the example.

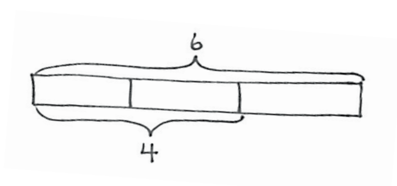
Example: $\frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3} = \frac{4 \times 2}{3} = \frac{8}{3}$

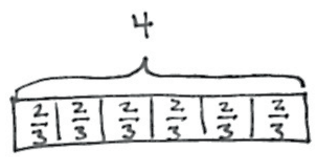
a. $\frac{7}{4} + \frac{7}{4} + \frac{7}{4} =$

b. $\frac{14}{5} + \frac{14}{5} =$

c. $\frac{4}{7} + \frac{4}{7} + \frac{4}{7} =$

3. Solve and model each problem as a fraction of a set and as repeated addition.





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

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

a. $\frac{1}{2} \times 8$

$8 \times \frac{1}{2}$

b. $\frac{3}{5} \times 10$

$10 \times \frac{3}{5}$

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

Example: $6 \times \frac{2}{3} = \frac{6 \times 2}{3} = \frac{3 \times 2 \times 2}{3} = \frac{3 \times 4}{3} = 4$ $6 \times \frac{2}{3} = \frac{\overset{2}{\cancel{6}} \times 2}{\underset{1}{\cancel{3}}} = 4$

a. $14 \times \frac{3}{7}$ $14 \times \frac{3}{7}$

b. $\frac{3}{4} \times 36$ $\frac{3}{4} \times 36$

c. $30 \times \frac{13}{10}$ $30 \times \frac{13}{10}$

d. $\frac{9}{8} \times 32$ $\frac{9}{8} \times 32$

5. Solve each problem any way you choose.

a. $\frac{1}{2} \times 60$ $\frac{1}{2}$ minute = __________ seconds

b. $\frac{3}{4} \times 60$ $\frac{3}{4}$ hour = __________ minutes

c. $\frac{3}{10} \times 1{,}000$ $\frac{3}{10}$ kilogram = __________ grams

d. $\frac{4}{5} \times 100$ $\frac{4}{5}$ meter = __________ centimeters

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. $\frac{5}{3}+\frac{5}{3}+\frac{5}{3}$

   b. $\frac{13}{5}+\frac{13}{5}$

   c. $\frac{9}{4}+\frac{9}{4}+\frac{9}{4}$

2. Solve using one of the methods below..

   Example: $\frac{2}{3}\times 6=\frac{2\times 6}{3}=\frac{12}{3}=4$ $\quad\quad$ $\frac{2}{3}\times 6=\frac{2\times \cancel{6}^{\,2}}{\cancel{3}_{\,1}}=4$

   a. $\frac{3}{4}\times 16$

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

   c. $40\times\frac{11}{10}$

   d. $\frac{7}{6}\times 36$

   e. $24\times\frac{5}{8}$

f. $18 \times \frac{5}{12}$ $\qquad$ $18 \times \frac{5}{12}$

g. $\frac{10}{9} \times 21$ $\qquad$ $\frac{10}{9} \times 21$

3. Solve each problem any way you choose.

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

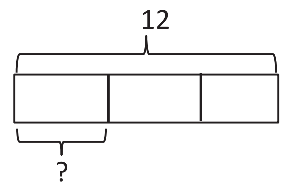
b. $\frac{4}{5} \times 60$ $\qquad$ $\frac{4}{5}$ hour = _________ minutes

c. $\frac{7}{10} \times 1000$ $\qquad$ $\frac{7}{10}$ kilogram = _________ grams

d. $\frac{3}{5} \times 100$ $\qquad$ $\frac{3}{5}$ meter = _________ centimeters

Name ____ Date ______________________

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

a. $\frac{1}{2}$ yard = __$1\frac{1}{2}$__ feet $\frac{1}{2}$ yard $= \frac{1}{2} \times 1$ yard $= \frac{1}{2} \times 3$ feet $= \frac{3}{2}$ feet $= 1\frac{1}{2}$ feet	b. $\frac{1}{3}$ foot = ________ inches $\frac{1}{3}$ foot $= \frac{1}{3} \times 1$ foot $= \frac{1}{3} \times 12$ inches $=$ 
c. $\frac{5}{6}$ year = ________ months	d. $\frac{4}{5}$ meter = ________ centimeters
e. $\frac{2}{3}$ hour = ________ minutes	f. $\frac{3}{4}$ yard = ________ inches

2. Mrs. Lang told her class that the class's pet hamster is $\frac{1}{4}$ ft in length. How long is the hamster in inches?

3. At the market, Mr. Paul bought $\frac{7}{8}$ lb of cashews and $\frac{3}{4}$ lb of walnuts.

   a. How many ounces of cashews did Mr. Paul buy?

   b. How many ounces of walnuts did Mr. Paul buy?

   c. How many more ounces of cashews than walnuts did Mr. Paul buy?

   d. If Mrs. Toombs bought $1\frac{1}{2}$ pounds of pistachios, who bought more nuts, Mr. Paul or Mrs. Toombs? How many ounces more?

4. A jewelry maker purchased 20 inches of gold chain. She used $\frac{3}{8}$ of the chain for a bracelet. How many inches of gold chain did she have left?

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

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

$= \frac{1}{4} \times 36$ inches

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

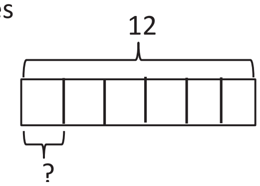
$= 9$ inches

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

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

$= \frac{1}{6} \times 12$ inches

$=$



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

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

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

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

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

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

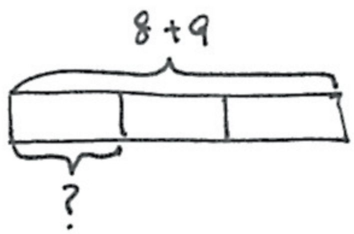
   c. How many more ounces of grapes than cherries did Ms. Winn buy?

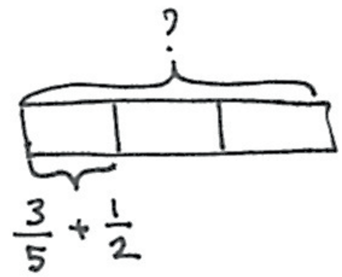
   d. If Mr. Phillips bought $1\frac{3}{4}$ pounds of raspberries, who bought more fruit, Ms. Winn or Mr. Phillips? How many ounces more?

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?

Name ______________________________ Date ____________________

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





2. Write an expression to match, and then evaluate.

a. $\frac{1}{6}$ the sum of 16 and 20

b. Subtract 5 from $\frac{1}{3}$ of 23.

c. 3 times as much as the sum of $\frac{3}{4}$ and $\frac{2}{6}$

d. $\frac{2}{5}$ of the product of $\frac{5}{6}$ and 42

e. 8 copies of the sum of 4 thirds and 2 more

f. 4 times as much as 1 third of 8

3. Circle the expression(s) that give the same product as $\frac{4}{5} \times 7$. Explain how you know.

$4 \div (7 \times 5)$ $7 \div 5 \times 4$ $(4 \times 7) \div 5$ $4 \div (5 \times 7)$ $4 \times \frac{7}{5}$ $7 \times \frac{4}{5}$

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

a. $4 \times 2 + 4 \times \frac{2}{3}$ ◯ $3 \times \frac{2}{3}$

b. $\left(5 \times \frac{3}{4}\right) \times \frac{2}{5}$ ◯ $\left(5 \times \frac{3}{4}\right) \times \frac{2}{7}$

c. $3 \times \left(3 + \frac{15}{12}\right)$ ◯ $(3 \times 3) + \frac{15}{12}$

5. Collette bought milk for herself each month and recorded the amount in the table below. For (a)–(c), write an expression that records the calculation described. Then, solve to find the missing data in the table.

Month	Amount (in gallons)
January	3
February	2
March	$1\frac{1}{4}$
April	
May	$\frac{7}{4}$
June	
July	2
August	1
September	
October	$\frac{1}{4}$

a. She bought $\frac{1}{4}$ of July's total in June.

b. She bought $\frac{3}{4}$ as much in September as she did in January and July combined.

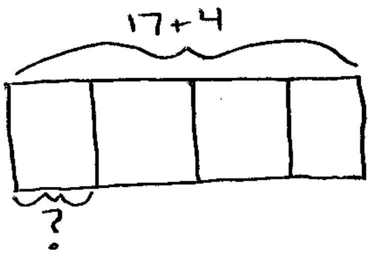
c. In April, she bought $\frac{1}{2}$ gallon less than twice as much as she bought in August.

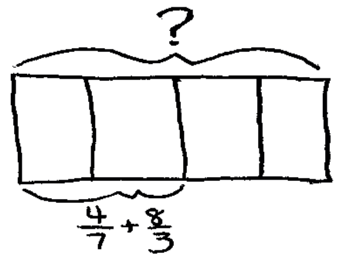
d. Display the data from the table in a line plot.

e. How many gallons of milk did Collette buy from January to October?

Name ____ Date ______________________

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





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

$8 \div (3 \times 6)$ $\quad$ $3 \div 8 \times 6$ $\quad$ $(6 \times 3) \div 8$ $\quad$ $(8 \div 6) \times 3$ $\quad$ $6 \times \frac{8}{3}$ $\quad$ $\frac{3}{8} \times 6$

3. Write an expression to match, and then evaluate.

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

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

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

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

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

f. 15 times as much as 1 fifth of 12

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

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

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

   b. $6 \times \left(2 + \frac{32}{16}\right)$ ○ $(6 \times 2) + \frac{32}{16}$

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.

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

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

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

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

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

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

Name ____ Date ______________________

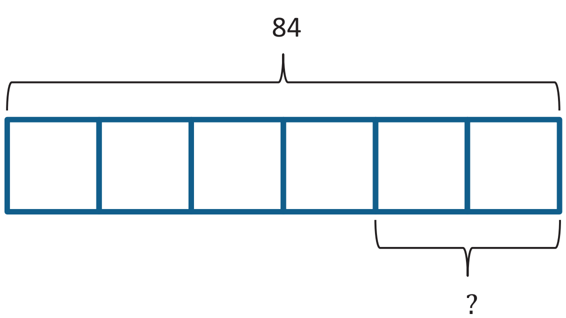
1. Kim and Courtney share a 16-ounce box of cereal. By the end of the week, Kim has eaten $\frac{3}{8}$ of the box, and Courtney has eaten $\frac{1}{4}$ of the box of cereal. What fraction of the box is left?

2. Mathilde has 20 pints of green paint. She uses $\frac{2}{5}$ of it to paint a landscape and $\frac{3}{10}$ of it while painting a clover. She decides that, for her next painting, she will need 14 pints of green paint. How much more paint will she need to buy?

3. Jack, Jill, and Bill each carried a 48-ounce bucket full of water down the hill. By the time they reached the bottom, Jack's bucket was only $\frac{3}{4}$ full, Jill's was $\frac{2}{3}$ full, and Bill's was $\frac{1}{6}$ full. How much water did they spill altogether on their way down the hill?

4. Mrs. Diaz makes 5 dozen cookies for her class. One-ninth of her 27 students are absent the day she brings the cookies. If she shares the cookies equally among the students who are present, how many cookies will each student get?

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



Name ______________________________ Date ____________________

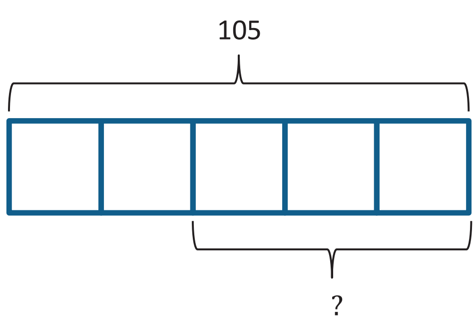
1. Jenny's mom says she has an hour before it's bedtime. Jenny spends $\frac{1}{3}$ of the hour texting a friend and $\frac{1}{4}$ of the time brushing her teeth and putting on her pajamas. She spends the rest of the time reading her book. How many minutes did Jenny read?

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?

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's 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?

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 PTA. members. Mr. Chan allowed the 12 student helpers to divide the cookies that were left equally. How many cookies will each student get?

5. Using the tape diagram below, create a story problem about a farm. Your story must include a fraction.



Name ______________________________ Date ________________

1. A baseball team played 32 games and lost 8. Katy was the catcher in $\frac{5}{8}$ of the winning games and $\frac{1}{4}$ of the losing games.

   a. What fraction of the games did the team win?

   b. In how many games did Katy play catcher?

2. In Mrs. Elliott's garden, $\frac{1}{8}$ of the flowers are red, $\frac{1}{4}$ of them are purple, and $\frac{1}{5}$ of the remaining flowers are pink. If there are 128 flowers, how many flowers are pink?

3. Lillian and Darlene plan to get their homework finished within one hour. Darlene completes her math homework in $\frac{3}{5}$ hour. Lillian completes her math homework with $\frac{5}{6}$ hour remaining. Who completes her homework faster, and by how many minutes?

   Bonus: Give the answer as a fraction of an hour.

4. Create and solve a story problem about a baker and some flour whose solution is given by the expression $\frac{1}{4} \times (3 + 5)$.

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?

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?

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?

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?

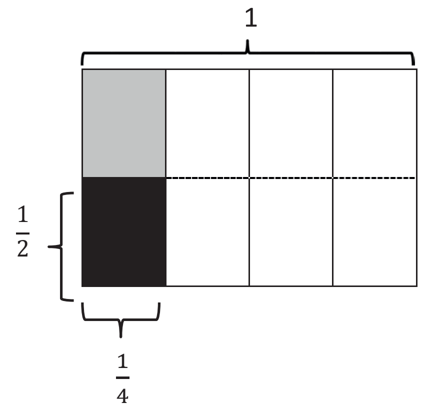
Bonus: Express the difference in their times as a fraction of a minute.

Name ____ Date ______________________

1. Solve. Draw a rectangular fraction model to show your thinking. Then, write a multiplication sentence. The first one has been done for you.

a. Half of $\frac{1}{4}$ pan of brownies = $\underline{\frac{1}{8}}$ pan of brownies.

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



b. Half of $\frac{1}{3}$ pan of brownies = _____ pan of brownies.

c. A fourth of $\frac{1}{3}$ pan of brownies = _____ pan of brownies.

d. $\frac{1}{4}$ of $\frac{1}{4}$

e. $\frac{1}{2}$ of $\frac{1}{6}$

2. Draw rectangular fraction models of $3 \times \frac{1}{4}$ and $\frac{1}{3} \times \frac{1}{4}$. Compare multiplying a number by 3 and by 1 third.

3. $\frac{1}{2}$ of Ila's workspace is covered in paper. $\frac{1}{3}$ of the paper is covered in yellow sticky notes. What fraction of Ila's workspace is covered in yellow sticky notes? Draw a picture to support your answer.

4. A marching band is rehearsing in rectangular formation. $\frac{1}{5}$ of the marching band members play percussion instruments. $\frac{1}{2}$ of the percussionists play the snare drum. What fraction of all the band members play the snare drum?

5. Marie is designing a bedspread for her grandson's new bedroom. $\frac{2}{3}$ of the bedspread is covered in race cars, and the rest is striped. $\frac{1}{4}$ of the stripes are red. What fraction of the bedspread is covered in red stripes?

Name ____ Date ______________________

1. Solve. Draw a rectangular fraction model to show your thinking.

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

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

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

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

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

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

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.

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.

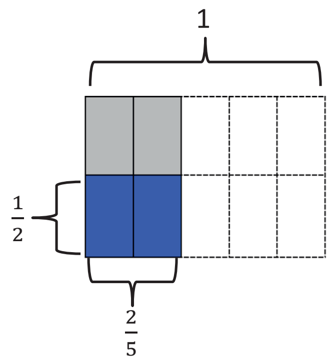
4. Diego eats $\frac{1}{5}$ of a loaf of bread each day. On Tuesday, Diego eats $\frac{1}{4}$ of the day's portion before lunch. What fraction of the whole loaf does Diego eat before lunch on Tuesday? Draw a rectangular fraction model to support your thinking.

Name ____ Date ______________________

1. Solve. Draw a rectangular fraction model to explain your thinking. Then, write a number sentence. An example has been done for you.

Example:

$\frac{1}{2}$ of $\frac{2}{5}$ = $\frac{1}{2}$ of 2 fifths = 1 fifth(s)



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

a. $\frac{1}{3}$ of $\frac{3}{4}$ = $\frac{1}{3}$ of ____ fourth(s) = ____ fourth(s)

b. $\frac{1}{2}$ of $\frac{4}{5}$ = $\frac{1}{2}$ of ____ fifth(s) = ____ fifth(s)

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

d. $\frac{2}{3}$ of $\frac{1}{2}$ =

e. $\frac{1}{2} \times \frac{3}{5}$ =

f. $\frac{2}{3} \times \frac{1}{4}$ =

2. $\frac{5}{8}$ of the songs on Harrison's music player are hip-hop. $\frac{1}{3}$ of the remaining songs are rhythm and blues. What fraction of all the songs are rhythm and blues? Use a tape diagram to solve.

3. Three-fifths of the students in a room are girls. One-third of the girls have blond hair. One-half of the boys have brown hair.

   a. What fraction of all the students are girls with blond hair?

   b. What fraction of all the students are boys without brown hair?

4. Cody and Sam mowed the yard on Saturday. Dad told Cody to mow $\frac{1}{4}$ of the yard. He told Sam to mow $\frac{1}{3}$ of the remainder of the yard. Dad paid each of the boys an equal amount. Sam said, "Dad, that's not fair! I had to mow one-third, and Cody only mowed one-fourth!" Explain to Sam the error in his thinking. Draw a picture to support your reasoning.

Name ____ Date ______________________

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

a. $\frac{1}{2}$ of $\frac{2}{3}$ = $\frac{1}{2}$ of _____ third(s) = _____ third(s)

b. $\frac{1}{2}$ of $\frac{4}{3}$ = $\frac{1}{2}$ of _____ third(s) = _____ third(s)

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

d. $\frac{1}{2}$ of $\frac{6}{8}$ =

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

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

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 of Sarah's photos is of her friends? Support your answer with a model.

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?

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

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.

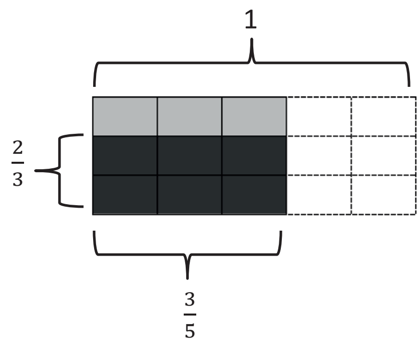
   b. What fraction of the pint of ice cream will be left if Grandpa Mick serves himself the same amount as the second grandchild?

Name ____ Date ______________________

1. Solve. Draw a rectangular fraction model to explain your thinking. Then, write a multiplication sentence. The first one is done for you.

   a. $\frac{2}{3}$ of $\frac{3}{5}$

   $\frac{2}{3} \times \frac{3}{5} = \frac{6}{15} = \frac{2}{5}$



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

   c. $\frac{2}{5}$ of $\frac{2}{3} =$

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

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

2. Multiply. Draw a rectangular fraction model if it helps you, or use the method in the example.

   Example: $\frac{6}{7} \times \frac{5}{8} = \frac{\overset{3}{\cancel{6}} \times 5}{7 \times \underset{4}{\cancel{8}}} = \frac{15}{28}$

   a. $\frac{3}{4} \times \frac{5}{6}$

   b. $\frac{4}{5} \times \frac{5}{8}$

c. $\frac{2}{3} \times \frac{6}{7}$

d. $\frac{4}{9} \times \frac{3}{10}$

3. Phillip's family traveled $\frac{3}{10}$ of the distance to his grandmother's house on Saturday. They traveled $\frac{4}{7}$ of the remaining distance on Sunday. What fraction of the total distance to his grandmother's house was traveled on Sunday?

4. Santino bought a $\frac{3}{4}$-pound bag of chocolate chips. He used $\frac{2}{3}$ of the bag while baking. How many pounds of chocolate chips did he use while baking?

5. Farmer Dave harvested his corn. He stored $\frac{5}{9}$ of his corn in one large silo and $\frac{3}{4}$ of the remaining corn in a small silo. The rest was taken to market to be sold.

   a. What fraction of the corn was stored in the small silo?

   b. If he harvested 18 tons of corn, how many tons did he take to market?

Name ______________________________________ Date ____________________

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

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

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

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

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

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

a. $\frac{5}{6} \times \frac{3}{10}$

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

c. $\frac{5}{6} \times \frac{5}{8}$

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

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

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

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 after school starts but before lunch?

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

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?

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?

   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?

Name ______________________________ Date ________________

Solve and show your thinking with a tape diagram.

1. Mrs. Onusko made 60 cookies for a bake sale. She sold $\frac{2}{3}$ of them and gave $\frac{3}{4}$ of the remaining cookies to the students working at the sale. How many cookies did she have left?

2. Joakim is icing 30 cupcakes. He spreads mint icing on $\frac{1}{5}$ of the cupcakes and chocolate on $\frac{1}{2}$ of the remaining cupcakes. The rest will get vanilla icing. How many cupcakes have vanilla icing?

3. The Booster Club sells 240 cheeseburgers. $\frac{1}{4}$ of the cheeseburgers had pickles, $\frac{1}{2}$ of the remaining burgers had onions, and the rest had tomato. How many cheeseburgers had tomato?

4. DeSean is sorting his rock collection. $\frac{2}{3}$ of the rocks are metamorphic, and $\frac{3}{4}$ of the remainder are igneous rocks. If the 3 rocks left over are sedimentary, how many rocks does DeSean have?

5. Milan puts $\frac{1}{4}$ of her lawn-mowing money in savings and uses $\frac{1}{2}$ of the remaining money to pay back her sister. If she has \$15 left, how much did she have at first?

6. Parks is wearing several rubber bracelets. $\frac{1}{3}$ of the bracelets are tie-dye, $\frac{1}{6}$ are blue, and $\frac{1}{3}$ of the remainder are camouflage. If Parks wears 2 camouflage bracelets, how many bracelets does he have on?

7. Ahmed spent $\frac{1}{3}$ of his money on a burrito and a water bottle. The burrito cost 2 times as much as the water. The burrito cost \$4. How much money does Ahmed have left?

Name ____ Date ______________________

Solve and show your thinking with a tape diagram.

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?

CHALLENGE !

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?

   b. How many votes were 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?

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.

e. How many girls voted for blue?

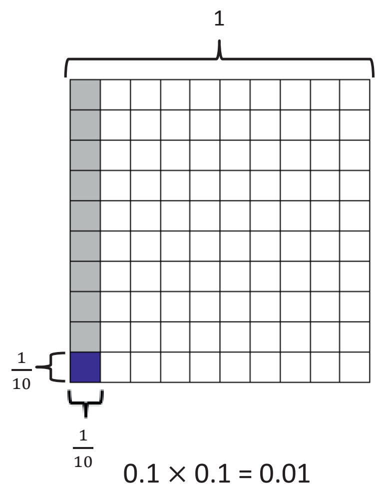
Name ____ Date ______________________

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

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

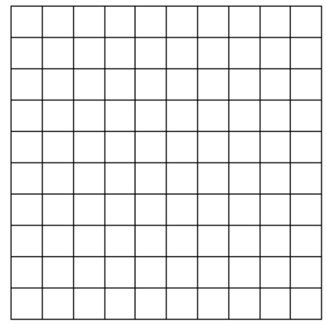
$= \frac{1 \times 1}{10 \times 10}$

$= \frac{1}{100}$

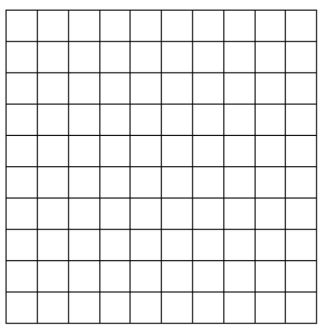


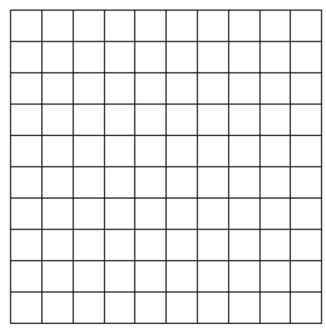
$0.1 \times 0.1 = 0.01$

b. $\frac{4}{10} \times \frac{3}{10}$

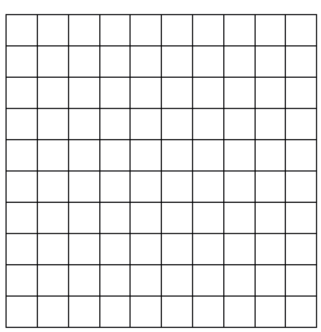


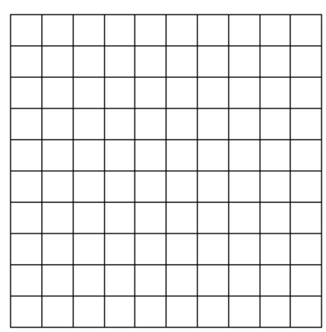
c. $\frac{1}{10} \times 1.4$





d. $\frac{6}{10} \times 1.7$





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

a. $5 \times 0.7 =$ _______

$= 5 \times \frac{7}{10}$

$= \frac{5 \times 7}{10}$

$= \frac{35}{10}$

$= 3.5$

b. $0.5 \times 0.7 =$ _______

$= \frac{5}{10} \times \frac{7}{10}$

$= \frac{5 \times 7}{10 \times 10}$

$=$

c. $0.05 \times 0.7 =$ _______

$= \frac{5}{100} \times \frac{7}{10}$

$= \frac{\_\_\times\_\_}{100 \times 10}$

$=$

d. $6 \times 0.3 =$ _______

e. $0.6 \times 0.3 =$ _______

f. $0.06 \times 0.3 =$ _______

g. $1.2 \times 4 =$ _______

h. $1.2 \times 0.4 =$ _______

i. $0.12 \times 0.4 =$ _______

3. A Boy Scout has a length of rope measuring 0.7 meter. He uses 2 tenths of the rope to tie a knot at one end. How many meters of rope are in the knot?

4. After just 4 tenths of a 2.5-mile race was completed, Lenox took the lead and remained there until the end of the race.

a. How many miles did Lenox lead the race?

b. Reid, the second-place finisher, developed a cramp with 3 tenths of the race remaining. How many miles did Reid run without a cramp?

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

a. $4 \times 0.6 =$ _______

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

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

$= \frac{24}{10}$

$= 2.4$

b. $0.4 \times 0.6 =$ _______

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

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

$=$

c. $0.04 \times 0.6 =$ _______

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

$= \frac{\_\_\times\_\_}{100 \times 10}$

$=$

d. $7 \times 0.3 =$ _______

e. $0.7 \times 0.3 =$ _______

f. $0.07 \times 0.3 =$ _______

g. $1.3 \times 5 =$ _______

h. $1.3 \times 0.5 =$ _______

i. $0.13 \times 0.5 =$ _______

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?

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

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

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

Name ____ Date ____________________

1. Multiply. Check your answer by counting the decimal places.

a. $2.3 \times 1.8 =$

b. $2.3 \times 0.9 =$

c. $6.6 \times 2.8 =$

d. $3.3 \times 1.4 =$

2. Multiply. Check your answer by counting the decimal places.

a. $2.38 \times 1.8 =$

b. $2.37 \times 0.9 =$

c. $6.06 \times 2.8 =$

d. $3.3 \times 0.14 =$

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

   a. $3.2 \times 0.6 = 1.92$

   b. $3.2 \times 1.2 =$ __________

   c. $8.31 \times 2.4 =$ __________

   d. $7.50 \times 3.5 =$ __________

4. Carolyn buys 1.2 pounds of chicken breast. If each pound of chicken breast costs $3.70, how much will she pay for the chicken breast?

5. A kitchen measures 3.75 meters by 4.2 meters.

   a. Find the area of the kitchen.

   b. The area of the living room is one and a half times that of the kitchen. Find the total area of the living room and the kitchen.

Name ____ Date ____________________

1. Multiply. Check your answer by counting the decimal places.

a. $3.3 \times 1.6 =$

b. $3.3 \times 0.8 =$

c. $4.4 \times 3.2 =$

d. $2.2 \times 1.6 =$

2. Multiply.

a. $3.36 \times 1.4 =$

b. $3.35 \times 0.7 =$

c. $4.04 \times 3.2 =$

d. $4.4 \times 0.16 =$

3. Solve.

a. $3.2 \times 0.6 =$

b. $2.3 \times 2.1 =$ __________

c. $7.41 \times 3.4 =$ __________

d. $6.50 \times 4.5 =$ __________

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

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

a. Find the area of the swimming pool.

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.

Name ____ Date ______________________

1. Convert. Express your answer as a mixed number, if possible. The first one is done for you.

a. 2 ft = $\underline{\frac{2}{3}}$ yd 2 ft = 2 × 1 ft = 2 × $\frac{1}{3}$ yd = $\frac{2}{3}$ yd	b. 4 ft = ________ yd 4 ft = 4 × 1 ft = 4 × ________ yd = ________ yd =
c. 7 in = ________ ft	d. 13 in = ________ ft
e. 5 oz = ________ lb	f. 18 oz = ________ lb

2. Regina buys 24 inches of trim for a craft project.

   a. What fraction of a yard does Regina buy?

   b. If a whole yard of trim costs $6, how much did Regina pay?

3. At Yo-Yo Yogurt, the scale says that Sara has 8 ounces of vanilla yogurt in her cup. Her father's yogurt weighs 11 ounces. How many pounds of frozen yogurt did they buy altogether? Express your answer as a mixed number.

4. Pheng-Xu drinks 1 cup of milk every day for lunch. How many gallons of milk does he drink in 2 weeks?

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

2. Marty buys 12 ounces of granola.

   a. What fraction of a pound of granola did Marty buy?

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

3. Sara and her dad visit Yo-Yo Yogurt again. This time, the scale says that Sara has 14 ounces 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.

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

Name ____ Date ______________________

1. Convert. Show your work. Express your answer as a mixed number. (Draw a tape diagram if it helps you.) 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. $1\frac{1}{2}$ qt = ______________ gal $1\frac{1}{2}$ qt $= 1\frac{1}{2} \times 1$ qt $= 1\frac{1}{2} \times \frac{1}{4}$ gal $= \frac{3}{2} \times \frac{1}{4}$ gal $=$
c. $4\frac{2}{3}$ ft = ______________ in	d. $9\frac{1}{2}$ pt = ______________ qt
e. $3\frac{3}{5}$ hr = ______________ min	f. $3\frac{2}{3}$ ft = ______________ yd

2. Three dump trucks are carrying topsoil to a construction site. Truck A carries 3,545 lb, Truck B carries 1,758 lb, and Truck C carries 3,697 lb. How many tons of topsoil are the 3 trucks carrying altogether?

3. Melissa buys $3\frac{3}{4}$ gallons of iced tea. Denita buys 7 quarts more than Melissa. How much tea do they buy altogether? Express your answer in quarts.

4. Marvin buys a hose that is $27\frac{3}{4}$ feet long. He already owns a hose at home that is $\frac{2}{3}$ the length of the new hose. How many total yards of hose does Marvin have now?

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 = <u>8</u> 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 = ______________ 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 $=$
c. $3\frac{5}{6}$ ft = ______________ in	d. $7\frac{1}{2}$ pt = ______________ qt
e. $4\frac{3}{10}$ hr = ______________ min	f. 33 months = ______________ years

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?

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

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

Name ______________________________ Date ________________

2. Express each fraction as an equivalent decimal.

a. $\frac{1}{4} \times \frac{25}{25} =$

b. $\frac{3}{4} \times \frac{25}{25} =$

c. $\frac{1}{5} \times \frac{}{} =$

d. $\frac{4}{5} \times \frac{}{} =$

e. $\frac{1}{20}$

f. $\frac{27}{20}$

g. $\frac{7}{4}$

h. $\frac{8}{5}$

3. Jack said that if you take a number and multiply it by a fraction, the product will always be smaller than what you started with. Is he correct? Why or why not? Explain your answer, and give at least two examples to support your thinking.

4. There is an infinite number of ways to represent 1 on the number line. In the space below, write at least four expressions multiplying by 1. Represent *one* differently in each expression.

5. Maria multiplied by 1 to rename $\frac{1}{4}$ as hundredths. She made factor pairs equal to 10. Use her method to change one-eighth to an equivalent decimal.

Maria's way: $\frac{1}{4} = \frac{1}{2 \times 2} \times \frac{5 \times 5}{5 \times 5} = \frac{5 \times 5}{(2 \times 5) \times (2 \times 5)} = \frac{25}{100} = 0.25$

$\frac{1}{8} =$

Paulo renamed $\frac{1}{8}$ as a decimal, too. He knows the decimal equal to $\frac{1}{4}$, and he knows that $\frac{1}{8}$ is half as much as $\frac{1}{4}$. Can you use his ideas to show another way to find the decimal equal to $\frac{1}{8}$?

Name ______________________________ Date ________________

2. Express each fraction as an equivalent decimal. The first one is partially done for you.

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

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

c. $\frac{2}{5} \times \frac{}{} =$

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

e. $\frac{3}{20}$

f. $\frac{25}{20}$

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.

4. A number multiplied by a fraction is not always smaller than the original number. Explain this and give at least two examples to support your thinking.

5. Elise has $\frac{3}{4}$ of a 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.

5. Johnny says multiplication always makes numbers bigger. Explain to Johnny why this isn't true. Give more than one example to help him understand.

6. A company uses a sketch to plan an advertisement on the side of a building. The lettering on the sketch is $\frac{3}{4}$ inch tall. In the actual advertisement, the letters must be 34 times as tall. How tall will the letters be on the building?

7. Jason is drawing the floor plan of his bedroom. He is drawing everything with dimensions that are $\frac{1}{12}$ of the actual size. His bed measures 6 ft by 3 ft, and the room measures 14 ft by 16 ft. What are the dimensions of his bed and room in his drawing?

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

   a. $3 \times$ _____ < 1

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

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?

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?

Name ______________________________________ Date ____________________

1. Fill in the blank using one of the following scaling factors to make each number sentence true.

1.021	0.989	1.00

a. 3.4 × _______ = 3.4   b. _______ × 0.21 > 0.21   c. 8.04 × _______ < 8.04

2.

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:

$\boxed{13.89} \times 1.004$ $\boxed{602} \times 0.489$ $\boxed{102.03} \times 4.015$

$\boxed{0.3} \times 0.069$ $\boxed{0.72} \times 1.24$ $\boxed{0.2} \times 0.1$

b. Explain your sorting by writing a sentence that tells what the expressions in each column of the table have in common.

3. 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. 4×0.988 ______________________________ 4

b. 1.05×0.8 ______________________________ 0.8

c. $1{,}725 \times 0.013$ ______________________________ 1,725

d. 989.001×1.003 ______________________________ 1.003

e. 0.002×0.911 ______________________________ 0.002

4. During science class, Teo, Carson, and Dhakir measure the length of their bean sprouts. Carson's sprout is 0.9 times the length of Teo's, and Dhakir's is 1.08 times the length of Teo's. Whose bean sprout is the longest? The shortest? Explain your reasoning.

5. Complete the following statements; then use decimals to give an example of each.

- $a \times b > a$ will always be true when b is…

- $a \times b < a$ will always be true when b is…

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:

$\boxed{12.5} \times 1.989$ $\boxed{828} \times 0.921$ $\boxed{321.46} \times 1.26$

$\boxed{0.007} \times 1.02$ $\boxed{2.16} \times 1.11$ $\boxed{0.05} \times 0.1$

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

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 ______________________________ 14

b. 1.01×2.06 ______________________________ 2.06

c. $1{,}955 \times 0.019$ ______________________________ 1,955

d. Two thousand × 1.0001 ______________________________ two thousand

e. Two-thousandths × 0.911 ______________________________ two-thousandths

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.

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.

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.

Name ____ Date ______________________

1. A vial contains 20 mL of medicine. If each dose is $\frac{1}{8}$ of the vial, how many mL is each dose? Express your answer as a decimal.

2. A container holds 0.7 liters of oil and vinegar. $\frac{3}{4}$ of the mixture is vinegar. How many liters of vinegar are in the container? Express your answer as both a fraction and a decimal.

3. Andres completed a 5-km race in 13.5 minutes. His sister's time was $1\frac{1}{2}$ times longer than his time. How long, in minutes, did it take his sister to run the race?

4. A clothing factory uses 1,275.2 meters of cloth a week to make shirts. How much cloth is needed to make $3\frac{3}{5}$ times as many shirts?

5. There are $\frac{3}{4}$ as many boys as girls in a class of fifth-graders. If there are 35 students in the class, how many are girls?

6. Ciro purchased a concert ticket for \$56. The cost of the ticket was $\frac{4}{5}$ the cost of his dinner. The cost of his hotel was $2\frac{1}{2}$ times as much as his ticket. How much did Ciro spend altogether for the concert ticket, hotel, and dinner?

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?

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.

3. A community bike ride offers a short 5.7-mile ride for children and families. The short ride is followed by a long ride, $5\frac{2}{3}$ times as long as the short ride, for adults. 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?

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?

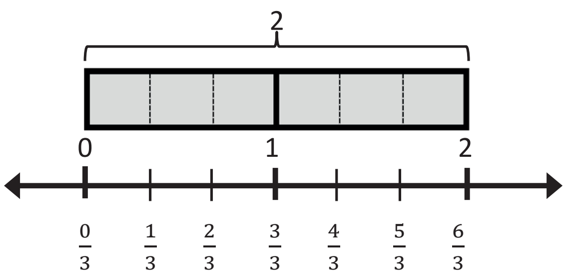
5. In the fifth grade at Lenape Elementary School, there are $\frac{4}{5}$ as many students who do not wear glasses as those who do wear glasses. If there are 60 students who wear glasses, how many students are in the fifth grade?

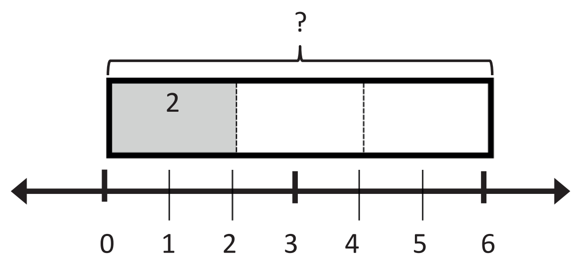
6. At a factory, a mechanic earns $17.25 an hour. The president of the company earns $6\frac{2}{3}$ times as much for each hour he works. The janitor at the same company earns $\frac{3}{5}$ as much as the mechanic. How much does the company pay for all three employees' wages for one hour of work?

Name ______________________________ Date ________________

1. Draw a tape diagram and a number line to solve. You may draw the model that makes the most sense to you. Fill in the blanks that follow. Use the example to help you.

Example: $2 \div \frac{1}{3} =$ __6__





There are __3__ thirds in 1 whole.

There are __6__ thirds in 2 wholes.

If 2 is $\frac{1}{3}$, what is the whole? __6__

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

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

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

d. $3 \div \frac{1}{5} =$ __________

2. Divide. Then, multiply to check.

a. $5 \div \frac{1}{2}$	b. $3 \div \frac{1}{2}$	c. $4 \div \frac{1}{5}$	d. $1 \div \frac{1}{6}$
e. $2 \div \frac{1}{8}$	f. $7 \div \frac{1}{6}$	g. $8 \div \frac{1}{3}$	h. $9 \div \frac{1}{4}$

3. For an art project, Mrs. Williams is dividing construction paper into fourths. How many fourths can she make from 5 pieces of construction paper?

4. Use the chart below to answer the following questions.

Donnie's Diner Lunch Menu

Food	Serving Size
Hamburger	$\frac{1}{3}$ lb
Pickles	$\frac{1}{4}$ pickle
Potato chips	$\frac{1}{8}$ bag
Chocolate milk	$\frac{1}{2}$ cup

a. How many hamburgers can Donnie make with 6 pounds of hamburger meat?

b. How many pickle servings can be made from a jar of 15 pickles?

c. How many servings of chocolate milk can he serve from a gallon of milk?

5. Three gallons of water fill $\frac{1}{4}$ of the elephant's pail at the zoo. How much water does the pail hold?

Name ____ Date ____________________

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

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

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

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

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

2. Divide. Then, multiply to check.

a. $2 \div \frac{1}{4}$	b. $6 \div \frac{1}{2}$	c. $5 \div \frac{1}{4}$	d. $5 \div \frac{1}{8}$
e. $6 \div \frac{1}{3}$	f. $3 \div \frac{1}{6}$	g. $6 \div \frac{1}{5}$	h. $6 \div \frac{1}{10}$

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?

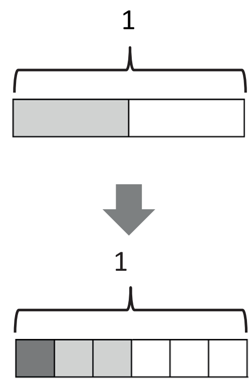
4. Some students prepare 3 different snacks. They make $\frac{1}{8}$ pound bags of nut mix, $\frac{1}{4}$ pound bags of cherries, and $\frac{1}{6}$ pound bags of dried fruit. If they buy 3 pounds of nut mix, 5 pounds of cherries, and 4 pounds of dried fruit, how many of each type of snack bag will they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

Name ______________________________ Date ______________

1. Draw a model or tape diagram to solve.

Example: $\frac{1}{2} \div 3$

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



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

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

c. $\frac{1}{4} \div 2 =$ ___________

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

2. Divide. Then, multiply to check.

a. $\frac{1}{2} \div 7$	b. $\frac{1}{3} \div 6$	c. $\frac{1}{4} \div 5$	d. $\frac{1}{5} \div 4$
e. $\frac{1}{5} \div 2$	f. $\frac{1}{6} \div 3$	g. $\frac{1}{8} \div 2$	h. $\frac{1}{10} \div 10$

3. Tasha eats half her snack and gives the other half to her two best friends for them to share equally. What portion of the whole snack does each friend get? Draw a picture to support your response.

4. Mrs. Appler used $\frac{1}{2}$ gallon of olive oil to make 8 identical batches of salad dressing.

   a. How many gallons of olive oil did she use in each batch of salad dressing?

   b. How many cups of olive oil did she use in each batch of salad dressing?

5. Mariano delivers newspapers. He always puts $\frac{3}{4}$ of his weekly earnings in his savings account and then divides the rest equally into 3 piggy banks for spending at the snack shop, the arcade, and the subway.

   a. What fraction of his earnings does Mariano put into each piggy bank?

   b. If Mariano adds \$2.40 to each piggy bank every week, how much does Mariano earn per week delivering papers?

Name ____ Date ______________________

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

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

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

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

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

2. Divide. Then, multiply to check.

a. $\frac{1}{2} \div 10$	b. $\frac{1}{4} \div 10$	c. $\frac{1}{3} \div 5$	d. $\frac{1}{5} \div 3$
e. $\frac{1}{8} \div 4$	f. $\frac{1}{7} \div 3$	g. $\frac{1}{10} \div 5$	h. $\frac{1}{5} \div 20$

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?

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?

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

Name ____ Date ______________________

1. Mrs. Silverstein bought 3 mini cakes for a birthday party. She cuts each cake into quarters and plans to serve each guest 1 quarter of a cake. How many guests can she serve with all her cakes? Draw a picture to support your response.

2. Mr. Pham has $\frac{1}{4}$ pan of lasagna left in the refrigerator. He wants to cut the lasagna into equal slices so he can have it for dinner for 3 nights. How much lasagna will he eat each night? Draw a picture to support your response.

3. The perimeter of a square is $\frac{1}{5}$ of a meter.

   a. Find the length of each side in meters. Draw a picture to support your response.

   b. How long is each side in centimeters?

4. A pallet holding 5 identical crates weighs $\frac{1}{4}$ of a ton.

   a. How many tons does each crate weigh? Draw a picture to support your response.

b. How many pounds does each crate weigh?

5. Faye has 5 pieces of ribbon, each 1 yard long. She cuts each ribbon into sixths.

a. How many sixths will she have after cutting all the ribbons?

b. How long will each of the sixths be in inches?

6. A glass pitcher is filled with water. $\frac{1}{8}$ of the water is poured equally into 2 glasses.

   a. What fraction of the water is in each glass?

   b. If each glass has 3 fluid ounces of water in it, how many fluid ounces of water were in the full pitcher?

   c. If $\frac{1}{4}$ of the remaining water is poured out of the pitcher to water a plant, how many cups of water are left in the pitcher?

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.

2. Virgil has $\frac{1}{6}$ of a birthday cake left over. He wants to share the leftover cake with 3 friends. What fraction of the original cake will each of the 4 people receive? Draw a picture to support your response.

3. A pitcher of water contains $\frac{1}{4}$ liters of 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.

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

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?

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

5. A container is filled with blueberries. $\frac{1}{6}$ of the blueberries is poured equally into two bowls.

   a. What fraction of the blueberries is in each bowl?

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

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

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: $2 \div 0.1 = 2 \div \frac{1}{10} = 20$

There are __10__ tenths in 1 whole.

There are __20__ tenths in 2 wholes.

a. $5 \div 0.1$

b. $8 \div 0.1$

c. $5.2 \div 0.1$

d. $8.7 \div 0.1$

e. $5 \div 0.01$

f. $8 \div 0.01$

2. Divide.

a. $6 \div 0.1$	b. $18 \div 0.1$	c. $6 \div 0.01$
d. $1.7 \div 0.1$	e. $31 \div 0.01$	f. $11 \div 0.01$
g. $125 \div 0.1$	h. $3.74 \div 0.01$	i. $12.5 \div 0.01$

3. Yung bought $4.60 worth of bubble gum. Each piece of gum cost $0.10. How many pieces of bubble gum did Yung buy?

4. Cheryl solved a problem: $84 \div 0.01 = 8{,}400$.

   Jane said, "Your answer is wrong because when you divide, the quotient is always smaller than the whole amount you start with, for example, $6 \div 2 = 3$ and $100 \div 4 = 25$." Who is correct? Explain your thinking.

5. The U.S. Mint sells 2 ounces of American Eagle gold coins to a collector. Each coin weighs one-tenth of an ounce. How many gold coins were sold to the collector?

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. $9 \div 0.1$

b. $6 \div 0.1$

c. $3.6 \div 0.1$

d. $12.8 \div 0.1$

e. $3 \div 0.01$

f. $7 \div 0.01$

2. Divide.

a. $2 \div 0.1$	b. $23 \div 0.1$	c. $5 \div 0.01$
d. $7.2 \div 0.1$	e. $51 \div 0.01$	f. $31 \div 0.1$
g. $231 \div 0.1$	h. $4.37 \div 0.01$	i. $24.5 \div 0.01$

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?

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.

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

Name ______________________________ Date ________________

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

a. $2.7 \div 0.3 = \frac{2.7}{0.3}$ $= \frac{2.7 \times 10}{0.3 \times 10}$ $= \frac{27}{3}$ $= 9$	b. $2.7 \div 0.03 = \frac{2.7}{0.03}$ $= \frac{2.7 \times 100}{0.03 \times 100}$ $= \frac{270}{3}$ $=$
c. $3.5 \div 0.5$	d. $3.5 \div 0.05$
e. $4.2 \div 0.7$	f. $0.42 \div 0.07$

g. $10.8 \div 0.9$	h. $1.08 \div 0.09$
i. $3.6 \div 1.2$	j. $0.36 \div 0.12$
k. $17.5 \div 2.5$	l. $1.75 \div 0.25$

2. $15 \div 3 = 5$. Explain why it is true that $1.5 \div 0.3$ and $0.15 \div 0.03$ have the same quotient.

3. Mr. Volok buys 2.4 kg of sugar for his bakery.

   a. If he pours 0.2 kg of sugar into separate bags, how many bags of sugar can he make?

   b. If he pours 0.4 kg of sugar into separate bags, how many bags of sugar can he make?

4. Two wires, one 17.4 meters long and one 7.5 meters long, were cut into pieces 0.3 meters long. How many such pieces can be made from both wires?

5. Mr. Smith has 15.6 pounds of oranges to pack for shipment. He can ship 2.4 pounds of oranges in a large box and 1.2 pounds in a small box. If he ships 5 large boxes, what is the minimum number of small boxes required to ship the rest of the oranges?

Name ____ Date ______________________

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

a. $2.4 \div 0.8 = \frac{2.4}{0.8}$ $= \frac{2.4 \times 10}{0.8 \times 10}$ $= \frac{24}{8}$ $=$	b. $2.4 \div 0.08 = \frac{2.4}{0.08}$ $= \frac{2.4 \times 100}{0.08 \times 100}$ $= \frac{240}{8}$ $=$
c. $4.8 \div 0.6$	d. $0.48 \div 0.06$
e. $8.4 \div 0.7$	f. $0.84 \div 0.07$

g. 4.5 ÷ 1.5	h. 0.45 ÷ 0.15
i. 14.4 ÷ 1.2	j. 1.44 ÷ 0.12

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

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?

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

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?

Name ____ Date ______________________

1. Circle the expression equivalent to *the sum of 3 and 2 divided by* $\frac{1}{3}$.

$\frac{3+2}{3}$ $\qquad$ $3 + (2 \div \frac{1}{3})$ $\qquad$ $(3 + 2) \div \frac{1}{3}$ $\qquad$ $\frac{1}{3} \div (3 + 2)$

2. Circle the expression(s) equivalent to *28 divided by the difference between* $\frac{4}{5}$ *and* $\frac{7}{10}$.

$28 \div \left(\frac{4}{5} - \frac{7}{10}\right)$ $\qquad$ $\frac{28}{\frac{4}{5} - \frac{7}{10}}$ $\qquad$ $\left(\frac{4}{5} - \frac{7}{10}\right) \div 28$ $\qquad$ $28 \div \left(\frac{7}{10} - \frac{4}{5}\right)$

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

a.	Half as much as the difference between $2\frac{1}{4}$ and $\frac{3}{8}$.	
b.	The difference between $2\frac{1}{4}$ and $\frac{3}{8}$ divided by 4.	
c.	A third of the sum of $\frac{7}{8}$ and 22 tenths.	
d.	Add 2.2 and $\frac{7}{8}$, and then triple the sum.	

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

5. Fill in the chart by writing an equivalent expression in word form.

a.		$\frac{3}{4} \times (1.75 + \frac{3}{5})$
b.		$\frac{7}{9} - (\frac{1}{8} \times 0.2)$
c.		$(1.75 + \frac{3}{5}) \times \frac{4}{3}$
d.		$2 \div (\frac{1}{2} \times \frac{4}{5})$

6. Compare the expressions in 5(a) and 5(c). Without evaluating, identify the expression that is less. Explain how you know.

7. Evaluate the following expressions.

a. $(9 - 5) \div \frac{1}{3}$

b. $\frac{5}{3} \times (2 \times \frac{1}{4})$

c. $\frac{1}{3} \div (1 \div \frac{1}{4})$

d. $\frac{1}{2} \times \frac{3}{5} \times \frac{5}{3}$

e. Half as much as $(\frac{3}{4} \times 0.2)$

f. 3 times as much as the quotient of 2.4 and 0.6

8. Choose an expression below that matches the story problem, and write it in the blank.

$\frac{2}{3} \times (20 - 5)$ $\quad (\frac{2}{3} \times 20) - (\frac{2}{3} \times 5)$ $\quad \frac{2}{3} \times 20 - 5$ $\quad (20 - \frac{2}{3}) - 5$

a. Farmer Green picked 20 carrots. He cooked $\frac{2}{3}$ of them, and then gave 5 to his rabbits. Write the expression that tells how many carrots he had left.

Expression: ____________________________________

b. Farmer Green picked 20 carrots. He cooked 5 of them, and then gave $\frac{2}{3}$ of the remaining carrots to his rabbits. Write the expression that tells how many carrots the rabbits will get.

Expression: ____________________________________

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	
b.		$(3\frac{1}{8} + 4.5) \div 5$
c.	Multiply $\frac{3}{5}$ by 5.8; then halve the product	
d.		$\frac{1}{6} \times (4.8 - \frac{1}{2})$
e.		$8 - (\frac{1}{2} \div 9)$

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

5. Evaluate the following expressions.

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

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

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

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

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

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.

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

$32 - 5 - \frac{1}{3}(32 - 5)$ $\qquad$ $\frac{2}{3} \times 32 - 5$ $\qquad$ $(32 - 5) \div \frac{1}{3}$ $\qquad$ $\frac{1}{3} \times (32 - 5)$

Name ____ Date ______________________

1. Ms. Hayes has $\frac{1}{2}$ liter of juice. She distributes it equally to 6 students in her tutoring group.

   a. How many liters of juice does each student get?

   b. How many more liters of juice will Ms. Hayes need if she wants to give each of the 24 students in her class the same amount of juice found in Part (a)?

2. Lucia has 3.5 hours left in her workday as a car mechanic. Lucia needs $\frac{1}{2}$ of an hour to complete one oil change.

   a. How many oil changes can Lucia complete during the rest of her workday?

   b. Lucia can complete two car inspections in the same amount of time it takes her to complete one oil change. How long does it take her to complete one car inspection?

   c. How many inspections can she complete in the rest of her workday?

3. Carlo buys $14.40 worth of grapefruit. Each grapefruit costs $0.80.

   a. How many grapefruits does Carlo buy?

   b. At the same store, Kahri spends one-third as much money on grapefruits as Carlo. How many grapefruits does she buy?

4. Studies show that a typical giant hummingbird can flap its wings once in 0.08 of a second.

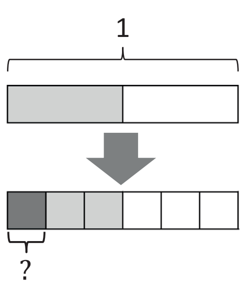
   a. While flying for 7.2 seconds, how many times will a typical giant hummingbird flap its wings?

   b. A ruby-throated hummingbird can flap its wings 4 times faster than a giant hummingbird. How many times will a ruby-throated hummingbird flap its wings in the same amount of time?

5. Create a story context for the following expression.

$$\frac{1}{3} \times (\$20 - \$3.20)$$

6. Create a story context about painting a wall for the following tape diagram.



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?

   b. If Chase wants to give this same serving size to each of 20 cats, how many kilograms of food will he need?

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?

   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?

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?

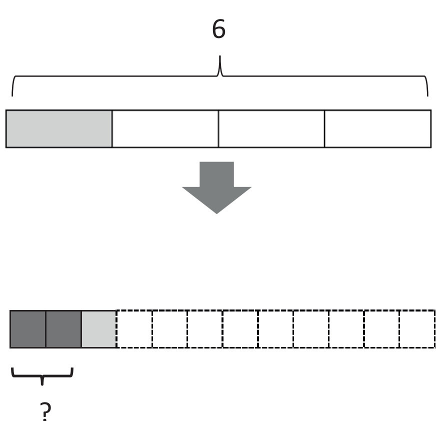
   b. If she changes her mind and instead buys a loaf of bread for $4.60 and uses the rest to buy cookies that cost $1\frac{1}{2}$ times as much as the macaroons, how many cookies can she buy?

4. Create a story context for the following expressions.

   a. $(5\frac{1}{4} - 2\frac{1}{8}) \div 4$

   b. $4 \times (\frac{4.8}{0.8})$

5. Create a story context for the following tape diagram.



Name ____ Date ____________________

Matthew and his 3 siblings are weeding a flower bed with an area of 9 square yards. If they share the job equally, how many square yards of the flower bed will each child need to weed? Use a tape diagram to show your thinking.

Lesson 5 Exit Ticket

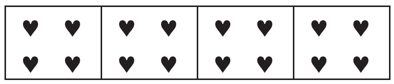
A grasshopper covered a distance of 5 yards in 9 equal hops. How many yards did the grasshopper travel on each hop?

a. Draw a picture to support your work.

b. How many yards did the grasshopper travel after hopping twice?

Name ____ Date ____________________

1. Find the value of each of the following.



a. $\frac{1}{4}$ of 16 =

b. $\frac{3}{4}$ of 16 =

2. Out of 18 cookies, $\frac{2}{3}$ are chocolate chip. How many of the cookies are chocolate chip?

Lesson 7 Exit Ticket

Solve using a tape diagram.

a. $\frac{3}{5}$ of 30

b. $\frac{3}{5}$ of a number is 30. What's the number?

c. Mrs. Johnson baked 2 dozen cookies. Two-thirds of the cookies were oatmeal. How many oatmeal cookies did Mrs. Johnson bake?

Name ____ Date ____________________

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

Example: $\frac{2}{3} \times 6 = \frac{2 \times 6}{3} = \frac{12}{3} = 4$ $\qquad$ $\frac{2}{3} \times 6 = \frac{2 \times \cancel{6}^{2}}{\cancel{3}_{1}} = 4$

a. $\frac{2}{3} \times 15$ $\qquad$ $\frac{2}{3} \times 15$

b. $\frac{5}{4} \times 12$ $\qquad$ $\frac{5}{4} \times 12$

Lesson 9 Exit Ticket

1. Express 36 minutes as a fraction of an hour: 36 minutes = _______ hour

2. Solve.

   a. $\frac{2}{3}$ feet = _______ inches $\qquad$ b. $\frac{2}{5}$ m = _______ cm $\qquad$ c. $\frac{5}{6}$ year = _______ months

Name ______________________________ Date ________________

In a classroom, $\frac{1}{6}$ of the students are wearing blue shirts, and $\frac{2}{3}$ are wearing white shirts. There are 36 students in the class. How many students are wearing a shirt other than blue or white?

Lesson 13 Exit Ticket

1. Solve.

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

Name ____ Date ____________________

1. Solve. Draw a rectangular fraction model to explain your thinking. Then, write a number sentence.

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

2. In a cookie jar, $\frac{1}{4}$ of the cookies are chocolate chip, and $\frac{1}{2}$ of the rest are peanut butter. What fraction of all the cookies is peanut butter?

Lesson 15 Exit Ticket

2. A newspaper's cover page is $\frac{3}{8}$ text, and photographs fill the rest. If $\frac{2}{5}$ of the text is an article about endangered species, what fraction of the cover page is the article about endangered species?

Name ______________________________ Date ______________

Multiply. Do at least one problem using unit form and at least one problem using fraction form.

a. $3.2 \times 1.4 =$

b. $1.6 \times 0.7 =$

c. $2.02 \times 4.2 =$

d. $2.2 \times 0.42 =$

Name ______________________________ Date ______________

1. An artist builds a sculpture out of metal and wood that weighs 14.9 kilograms. $\frac{3}{4}$ of this weight is metal, and the rest is wood. How much does the wood part of the sculpture weigh?

Lesson 21 Exit Ticket

2. Express the fractions as equivalent decimals.

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

b. $\frac{2}{5} =$

c. $\frac{3}{25} =$

d. $\frac{5}{20} =$

Name ______________________________ Date ________________

1. Solve. Support at least one of your answers with a model or tape diagram.

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

   b. $\frac{1}{8} \div 5 =$ ______

Lesson 25 Exit Ticket

2. Ms. Leverenz is doing an art project with her class. She has a 3 foot piece of ribbon. If she gives each student an eighth of a foot of ribbon, will she have enough for her class of 22 students?

Name ____ Date ____________________

1. Kevin divides 3 pieces of paper into fourths. How many fourths does he have? Draw a picture to support your response.

2. Sybil has $\frac{1}{2}$ of a pizza left over. She wants to share the pizza with 3 of her friends. What fraction of the original pizza will Sybil and her 3 friends each receive? Draw a picture to support your response.

Name ____ Date ______________________

3. $15.09 \div 0.01 =$ _______

4. $267.4 \div \frac{1}{10} =$ _______

5. $632.98 \div \frac{1}{100} =$ _______

Name ______________________________ Date ______________

Rewrite the division expression as a fraction and divide.

a. $3.2 \div 0.8$	b. $3.2 \div 0.08$
c. $7.2 \div 0.9$	d. $0.72 \div 0.09$

Name ______________________________ Date ________________

An entire commercial break is 3.6 minutes.

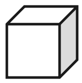
a. If each commercial takes 0.6 minutes, how many commercials will be played?

b. A different commercial break of the same length plays commercials half as long. How many commercials will play during this break?

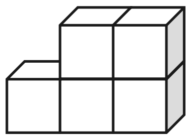
Name ____ Date ______________________

1. Use your centimeter cubes to build the figures pictured below on centimeter grid paper. Find the total volume of each figure you built, and explain how you counted the cubic units. Be sure to include units.

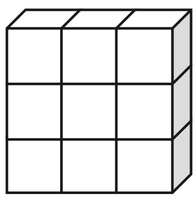
A.



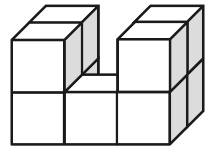
B.



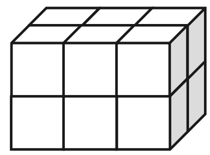
C.



D.



E.



F.

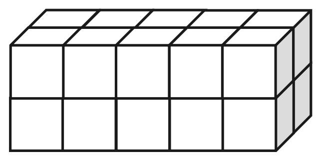
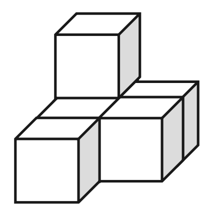


Figure	Volume	Explanation
A		
B		
C		
D		
E		
F		

3. Joyce says that the figure below, made of 1 cm cubes, has a volume of 5 cubic centimeters.
   a. Explain her mistake.

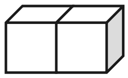


   b. Imagine if Joyce adds to the second layer so the cubes completely cover the first layer in the figure above. What would be the volume of the new structure? Explain how you know.

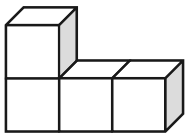
Name ____ Date ______________________

1. The following solids are made up of 1 cm cubes. Find the total volume of each figure, and write it in the chart below.

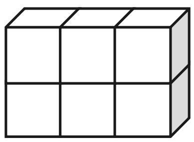
A.



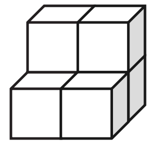
B.



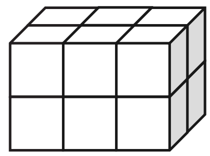
C.



D.



E.



F.

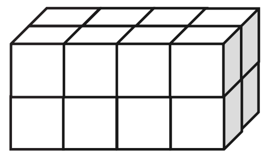
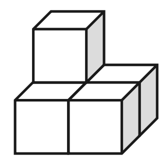
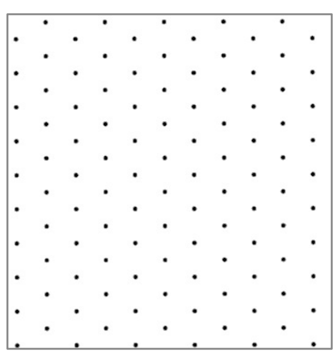


Figure	Volume	Explanation
A		
B		
C		
D		
E		
F		

3. John built and drew a structure that has a volume of 5 cubic centimeters. His little brother tells him he made a mistake because he only drew 4 cubes. Help John explain to his brother why his drawing is accurate.



4. Draw another figure below that represents a structure with a volume of 5 cubic centimeters.

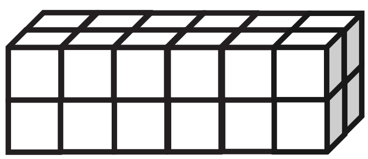


Name ____ Date _____________________

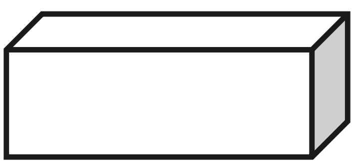
1. Use the prisms to find the volume.

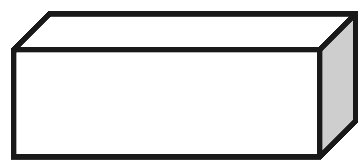
   - Build the rectangular prism pictured below to the left with your cubes, if necessary.
   - Decompose it into layers in three different ways, and show your thinking on the blank prisms.
   - Complete the missing information in the table.

a.

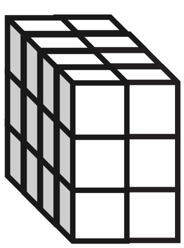


Number of Layers	Number of Cubes in Each Layer	Volume of the Prism
		cubic cm
		cubic cm
		cubic cm

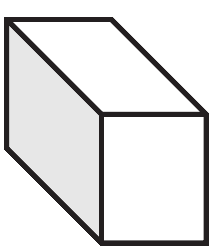
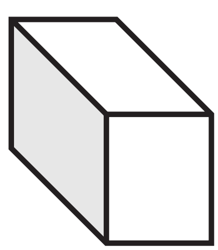
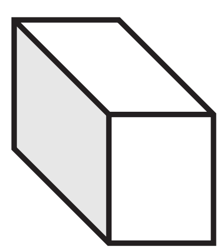




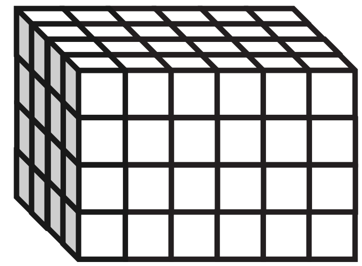
b.



Number of Layers	Number of Cubes in Each Layer	Volume of the Prism
		cubic cm
		cubic cm
		cubic cm

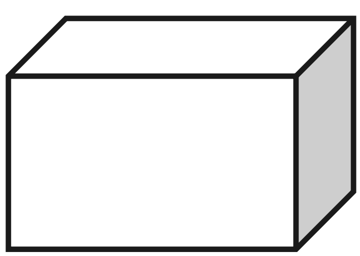
2. Josh and Jonah were finding the volume of the prism to the right. The boys agree that 4 layers can be added together to find the volume. Josh says that he can see on the end of the prism that each layer will have 16 cubes in it. Jonah says that each layer has 24 cubes in it. Who is right? Explain how you know using words, numbers, and/or pictures.



3. Marcos makes a prism 1 inch by 5 inches by 5 inches. He then decides to create layers equal to his first one. Fill in the chart below, and explain how you know the volume of each new prism.

Number of Layers	Volume	Explanation
2		
4		
7		

4. Imagine the rectangular prism below is 6 meters long, 4 meters tall, and 2 meters wide. Draw horizontal lines to show how the prism could be decomposed into layers that are 1 meter in height.



It has _____ layers from bottom to top.

Each horizontal layer contains ______ cubic meters.

The volume of this prism is __________.

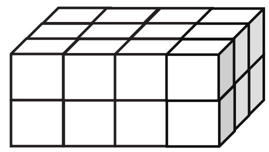
Name ____ Date _____________________

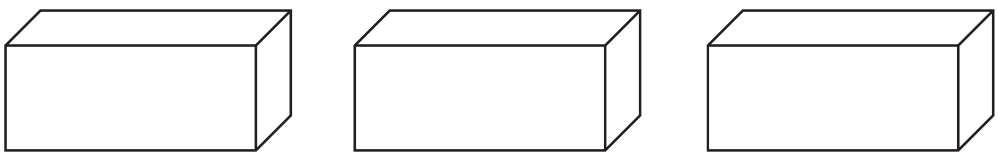
1. Use the prisms to find the volume.

- The rectangular prisms pictured below were constructed with 1 cm cubes.
- Decompose each prism into layers in three different ways, and show your thinking on the blank prisms.
- Complete each table.

a.

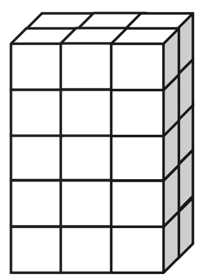
Number of Layers	Number of Cubes in Each Layer	Volume of the Prism
		cubic cm
		cubic cm
		cubic cm

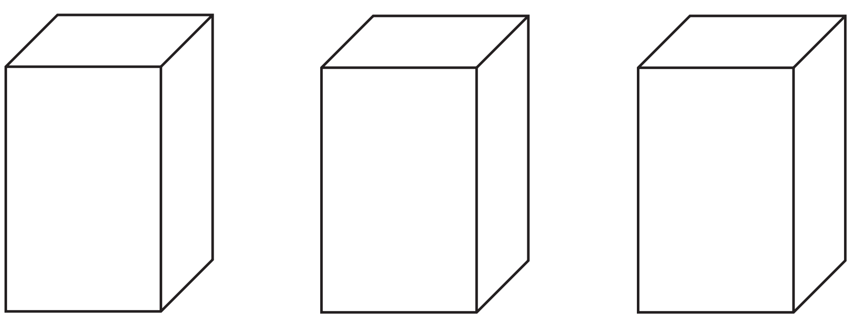




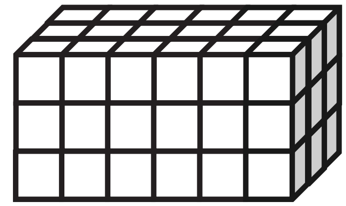
b.

Number of Layers	Number of Cubes in Each Layer	Volume of the Prism
		cubic cm
		cubic cm
		cubic cm





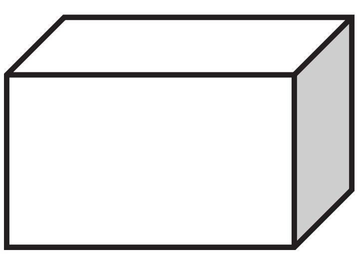
2. Stephen and Chelsea want to increase the volume of this prism by 72 cubic centimeters. Chelsea wants to add eight layers, and Stephen says they only need to add four layers. Their teacher tells them they are both correct. Explain how this is possible.



3. Juliana makes a prism 4 inches across and 4 inches wide but only 1 inch tall. She then decides to create layers equal to her first one. Fill in the chart below, and explain how you know the volume of each new prism.

Number of Layers	Volume	Explanation
3		
5		
7		

4. Imagine the rectangular prism below is 4 meters long, 3 meters tall, and 2 meters wide. Draw horizontal lines to show how the prism could be decomposed into layers that are 1 meter in height.



It has _____ layers from top to bottom.

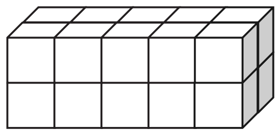
Each horizontal layer contains ______ cubic meters.

The volume of this prism is __________

Name ____ Date ______________________

1. Each rectangular prism is built from centimeter cubes. State the dimensions, and find the volume.

a.



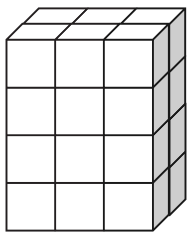
Length: _______ cm

Width: _______ cm

Height: _______ cm

Volume: _______ cm^3

b.



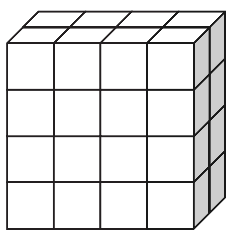
Length: _______ cm

Width: _______ cm

Height: _______ cm

Volume: _______ cm^3

c.



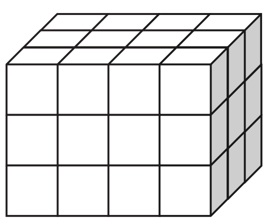
Length: _______ cm

Width: _______ cm

Height: _______ cm

Volume: _______ cm^3

d.



Length: _______ cm

Width: _______ cm

Height: _______ cm

Volume: _______ cm^3

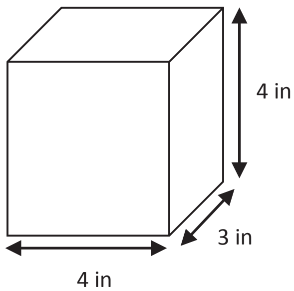
2. Write a multiplication sentence that you could use to calculate the volume for each rectangular prism in Problem 1. Include the units in your sentences.

a. ______________________________ b. ______________________________

c. ______________________________ d. ______________________________

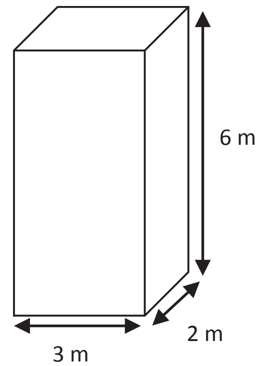
3. Calculate the volume of each rectangular prism. Include the units in your number sentences.

a.



V = ______________________________________

b.

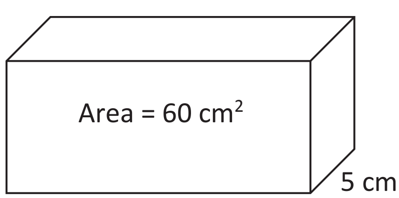


V = ______________________________________

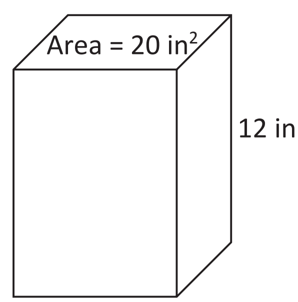
4. Tyron is constructing a box in the shape of a rectangular prism to store his baseball cards. It has a length of 10 centimeters, a width of 7 centimeters, and a height of 8 centimeters. What is the volume of the box?

5. Aaron says more information is needed to find the volume of the prisms. Explain why Aaron is mistaken, and calculate the volume of the prisms.

a.



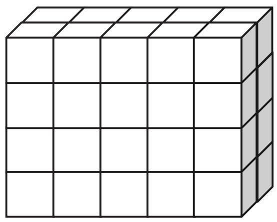
b.



Name ____ Date ______________________

1. Each rectangular prism is built from centimeter cubes. State the dimensions, and find the volume.

a.



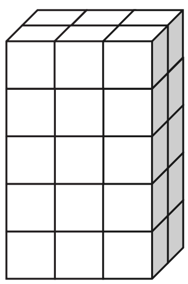
Length: _______ cm

Width: _______ cm

Height: _______ cm

Volume: _______ cm^3

b.



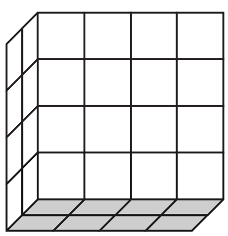
Length: _______ cm

Width: _______ cm

Height: _______ cm

Volume: _______ cm^3

c.



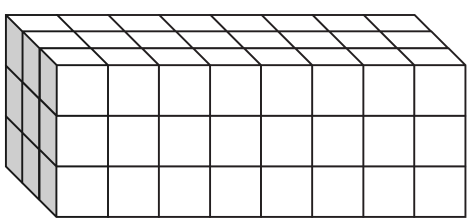
Length: _______ cm

Width: _______ cm

Height: _______ cm

Volume: _______ cm^3

d.



Length: _______ cm

Width: _______ cm

Height: _______ cm

Volume: _______ cm^3

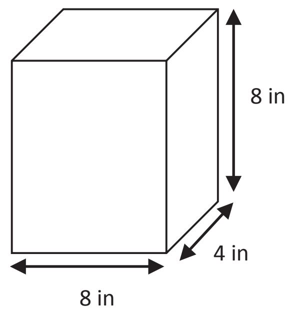
2. Write a multiplication sentence that you could use to calculate the volume for each rectangular prism in Problem 1. Include the units in your sentences.

a. ______________________________ b. ______________________________

c. ______________________________ d. ______________________________

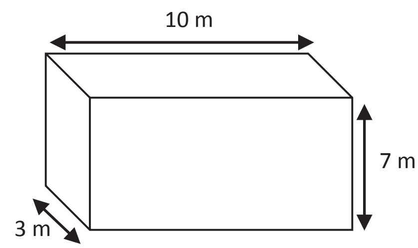
3. Calculate the volume of each rectangular prism. Include the units in your number sentences.

a.



Volume: ________________________________

b.



Volume: ________________________________

4. Mrs. Johnson is constructing a box in the shape of a rectangular prism to store clothes for the summer. It has a length of 28 inches, a width of 24 inches, and a height of 30 inches. What is the volume of the box?

5. Calculate the volume of each rectangular prism using the information that is provided.

a. Face area: 56 square meters

Height: 4 meters

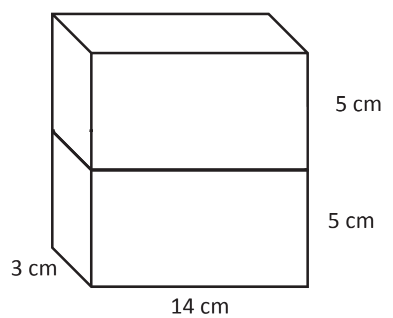
b. Face area: 169 square inches

Height: 14 inches

Name ____ Date ______________________

1. Find the total volume of the figures, and record your solution strategy.

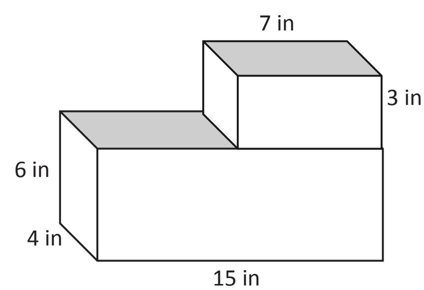
a.



Volume: ______________________________

Solution Strategy:

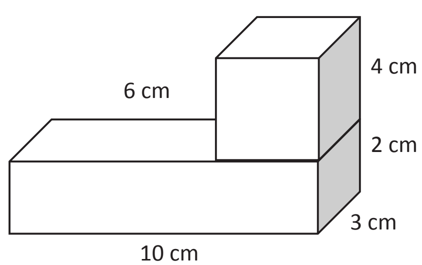
b.



Volume: ______________________________

Solution Strategy:

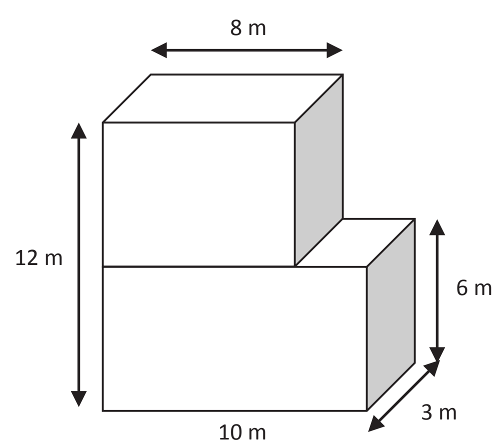
c.



Volume: ______________________________

Solution Strategy:

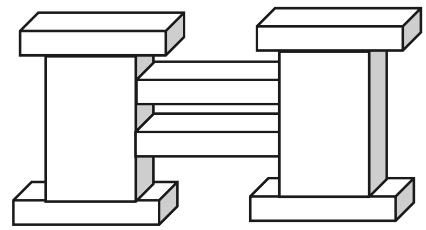
d.



Volume: ______________________________

Solution Strategy:

2. A sculpture (pictured below) is made of two sizes of rectangular prisms. One size measures 13 in by 8 in by 2 in. The other size measures 9 in by 8 in by 18 in. What is the total volume of the sculpture?



3. The combined volume of two identical cubes is 128 cubic centimeters. What is the side length of each cube?

4. A rectangular tank with a base area of 24 cm^2 is filled with water and oil to a depth of 9 cm. The oil and water separate into two layers when the oil rises to the top. If the thickness of the oil layer is 4 cm, what is the volume of the water?

5. Two rectangular prisms have a combined volume of 432 cubic feet. Prism A has half the volume of Prism B.

   a. What is the volume of Prism A? Prism B?

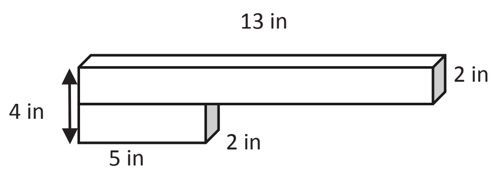
   b. If Prism A has a base area of 24 ft^2, what is the height of Prism A?

   c. If Prism B's base is $\frac{2}{3}$ the area of Prism A's base, what is the height of Prism B?

Name ____ Date ______________________

1. Find the total volume of the figures, and record your solution strategy.

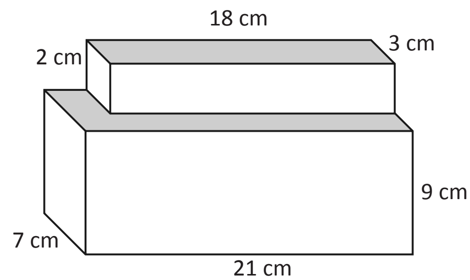
a.



Volume: ______________________________

Solution Strategy:

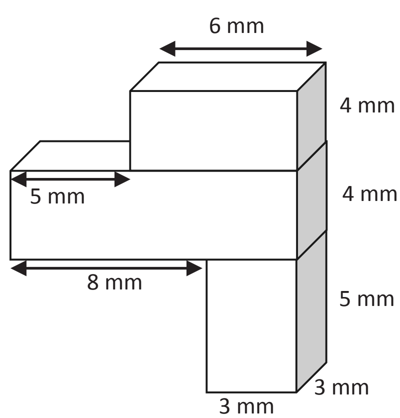
b.



Volume: ______________________________

Solution Strategy:

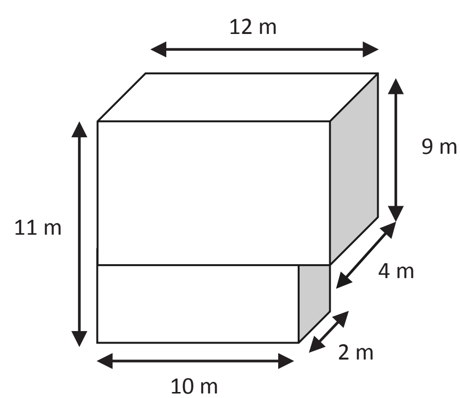
c.



Volume: ______________________________

Solution Strategy:

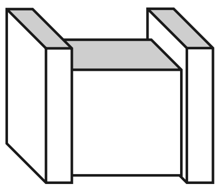
d.



Volume: ______________________________

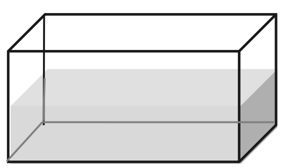
Solution Strategy:

2. The figure below is made of two sizes of rectangular prisms. One type of prism measures 3 inches by 6 inches by 14 inches. The other type measures 15 inches by 5 inches by 10 inches. What is the total volume of this figure?



3. The combined volume of two identical cubes is 250 cubic centimeters. What is the measure of one cube's edge?

4. A fish tank has a base area of 45 cm^2 and is filled with water to a depth of 12 cm. If the height of the tank is 25 cm, how much more water will be needed to fill the tank to the brim?



5. Three rectangular prisms have a combined volume of 518 cubic feet. Prism A has one-third the volume of Prism B, and Prisms B and C have equal volume. What is the volume of each prism?

Name ____ Date ______________________

Geoffrey builds rectangular planters.

1. Geoffrey's first planter is 8 feet long and 2 feet wide. The container is filled with soil to a height of 3 feet in the planter. What is the volume of soil in the planter? Explain your work using a diagram.

2. Geoffrey wants to grow some tomatoes in four large planters. He wants each planter to have a volume of 320 cubic feet, but he wants them all to be different. Show four different ways Geoffrey can make these planters, and draw diagrams with the planters' measurements on them.

Planter A	Planter B
Planter C	Planter D

3. Geoffrey wants to make one planter that extends from the ground to just below his back window. The window starts 3 feet off the ground. If he wants the planter to hold 36 cubic feet of soil, name one way he could build the planter so it is not taller than 3 feet. Explain how you know.

4. After all of this gardening work, Geoffrey decides he needs a new shed to replace the old one. His current shed is a rectangular prism that measures 6 feet long by 5 feet wide by 8 feet high. He realizes he needs a shed with 480 cubic feet of storage.

   a. Will he achieve his goal if he doubles each dimension? Why or why not?

   b. If he wants to keep the height the same, what could the other dimensions be for him to get the volume he wants?

   c. If he uses the dimensions in part (b), what could be the area of the new shed's floor?

Name ______________________________ Date ________________

Wren makes some rectangular display boxes.

1. Wren's first display box is 6 inches long, 9 inches wide, and 4 inches high. What is the volume of the display box? Explain your work using a diagram.

2. Wren wants to put some artwork into three shadow boxes. She knows they all need a volume of 60 cubic inches, but she wants them all to be different. Show three different ways Wren can make these boxes by drawing diagrams and labeling the measurements.

Shadow Box A	Shadow Box B
Shadow Box C	

3. Wren wants to build a box to organize her scrapbook supplies. She has a stencil set that is 12 inches wide that needs to lay flat in the bottom of the box. The supply box must also be no taller than 2 inches. Name one way she could build a supply box with a volume of 72 cubic inches.

4. After all of this organizing, Wren decides she also needs more storage for her soccer equipment. Her current storage box measures 1 foot long by 2 feet wide by 2 feet high. She realizes she needs to replace it with a box with 12 cubic feet of storage, so she doubles the width.

   a. Will she achieve her goal if she does this? Why or why not?

   b. If she wants to keep the height the same, what could the other dimensions be for a 12-cubic-foot storage box?

   c. If she uses the dimensions in part (b), what is the area of the new storage box's floor?

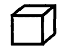
   d. How has the area of the bottom in her new storage box changed? Explain how you know.

Name : ____________________ Score : ____________________

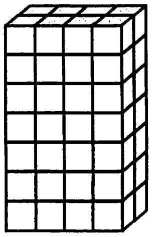
Counting Cubes - Rectangular Prism

ES1

Count the cubes and find the volume of each rectangular prism.

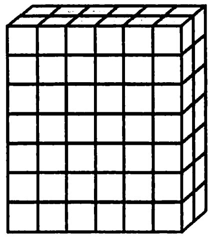
 = 1 cm^3

1)



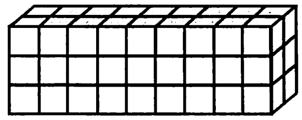
Volume = ________________

2)



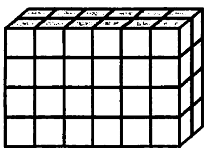
Volume = ________________

3)



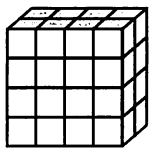
Volume = ________________

4)



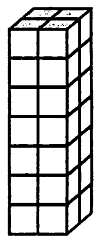
Volume = ________________

5)



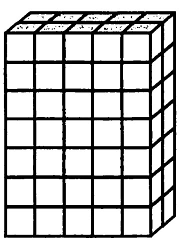
Volume = ________________

6)



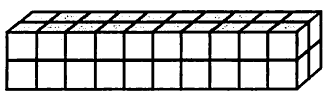
Volume = ________________

7)



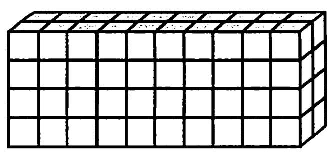
Volume = ________________

8)



Volume = ________________

9)



Volume = ________________

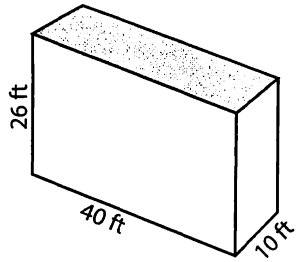
Name : ________________ Score : ________________

Volume - Rectangular Prism

MS1

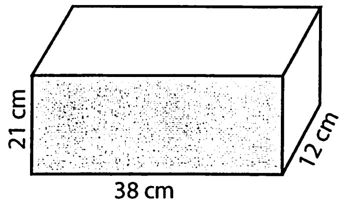
Find the volume of each rectangular prism.

1)



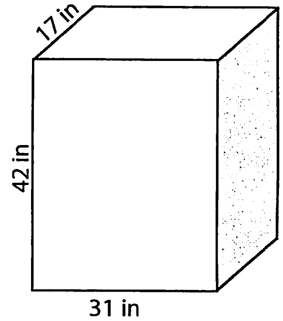
Volume = ______________

2)



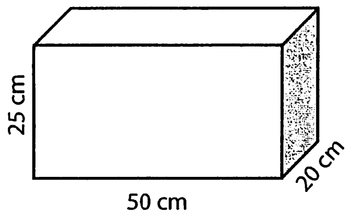
Volume = ______________

3)



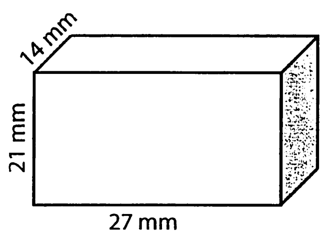
Volume = ______________

4)



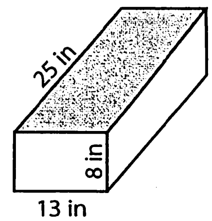
Volume = ______________

5)



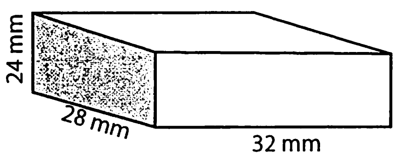
Volume = ______________

6)



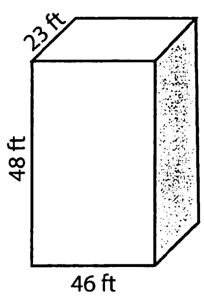
Volume = ______________

7)



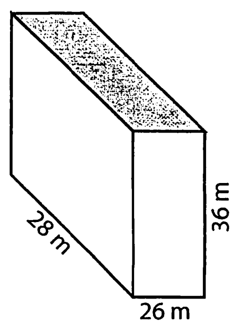
Volume = ______________

8)



Volume = ______________

9)

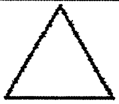
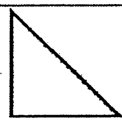
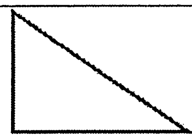


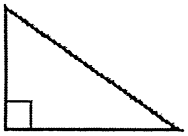
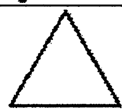
Volume = ______________

10) A cooler has a length of 25 inches, a width of 19 inches and a height of 15 inches. How much ice would the cooler hold?

Volume = ______________

Classifying Triangles

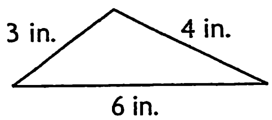
You can classify triangles by their sides.		
 **Equilateral triangle** Has 3 sides that are the same length.	 **Isosceles triangle** Has at least 2 sides that are the same length.	 **Scalene triangle** Has no sides that are the same length.

You can also classify triangles by their angles.		
 **Right triangle** Has 1 angle that is a right angle (90 degrees).	 **Acute triangle** Has all 3 angles that are acute angle (less than 90 degrees).	 **Obtuse triangle** Has 1 angle that is an obtuse angle (greater than 90 degrees).

Triangles

Classify each triangle. Write *isosceles, scalene,* or *equilateral.*

1.



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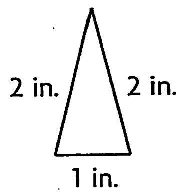
2.



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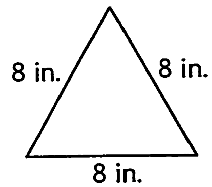
3.



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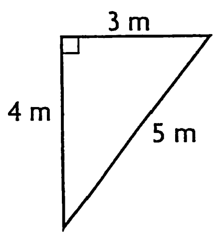
Classify each triangle. Write *right, acute,* or *obtuse.*

4.



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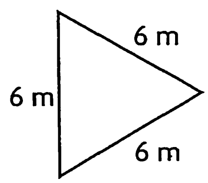
5.



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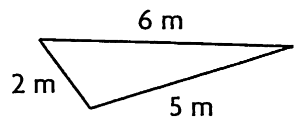
6.



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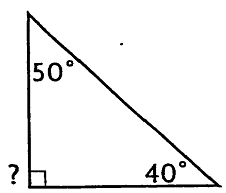
Challenge:

Find the unknown angle measure. (All angles add up to 180°)

Bonus!

7.



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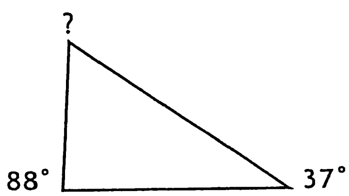
8.



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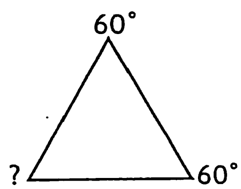
9.



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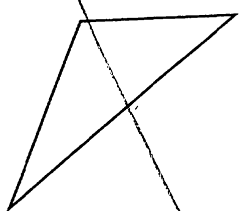
Name : ____________________ Score : ____________________

Identifying Triangles

Sides & Angles: S1

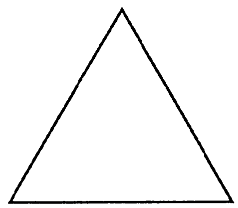
Identify each triangle based on both sides and angles.

1)



Scalene obtuse triangle

2)



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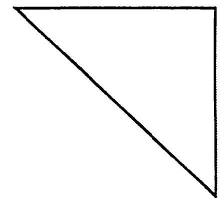
3)



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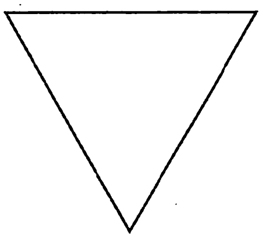
4)



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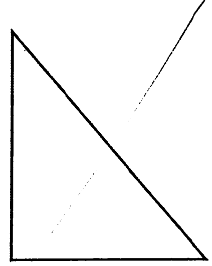
5)



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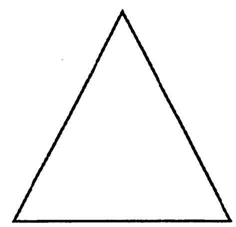
6)



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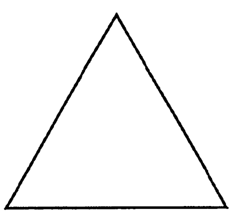
7)



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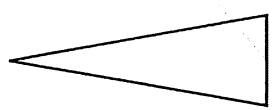
8)



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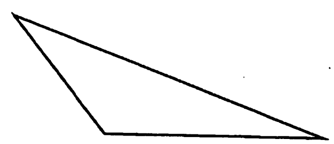
9)



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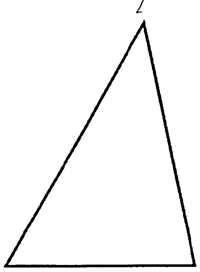
10)



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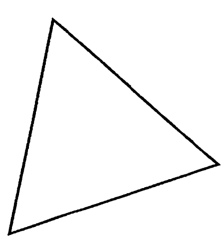
11)



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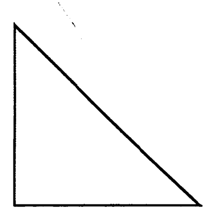
12)



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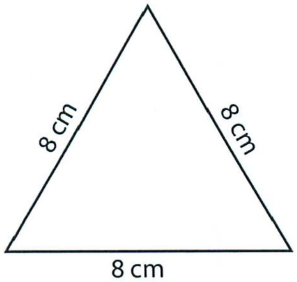
Identifying Triangles

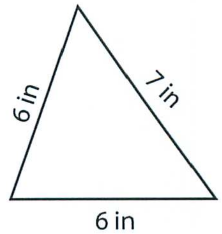
Identify each triangle based on both sides and angles.

1)

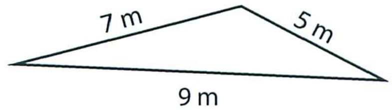


Equilateral acute triangle

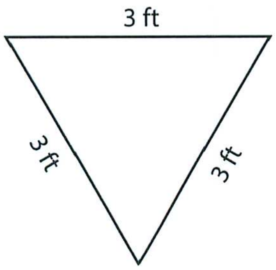
2)



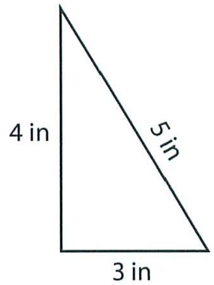
3)



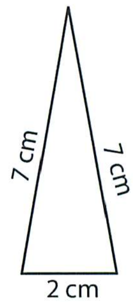
4)



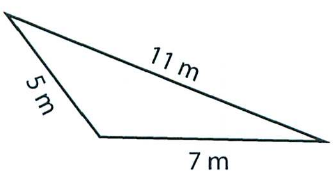
5)



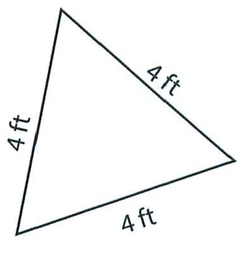
6)



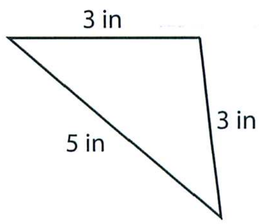
7)



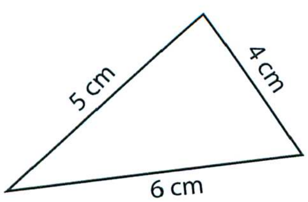
8)



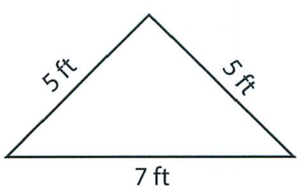
9)



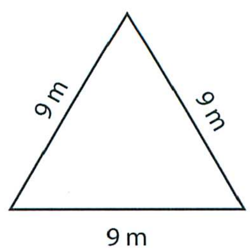
10)



11)



12)



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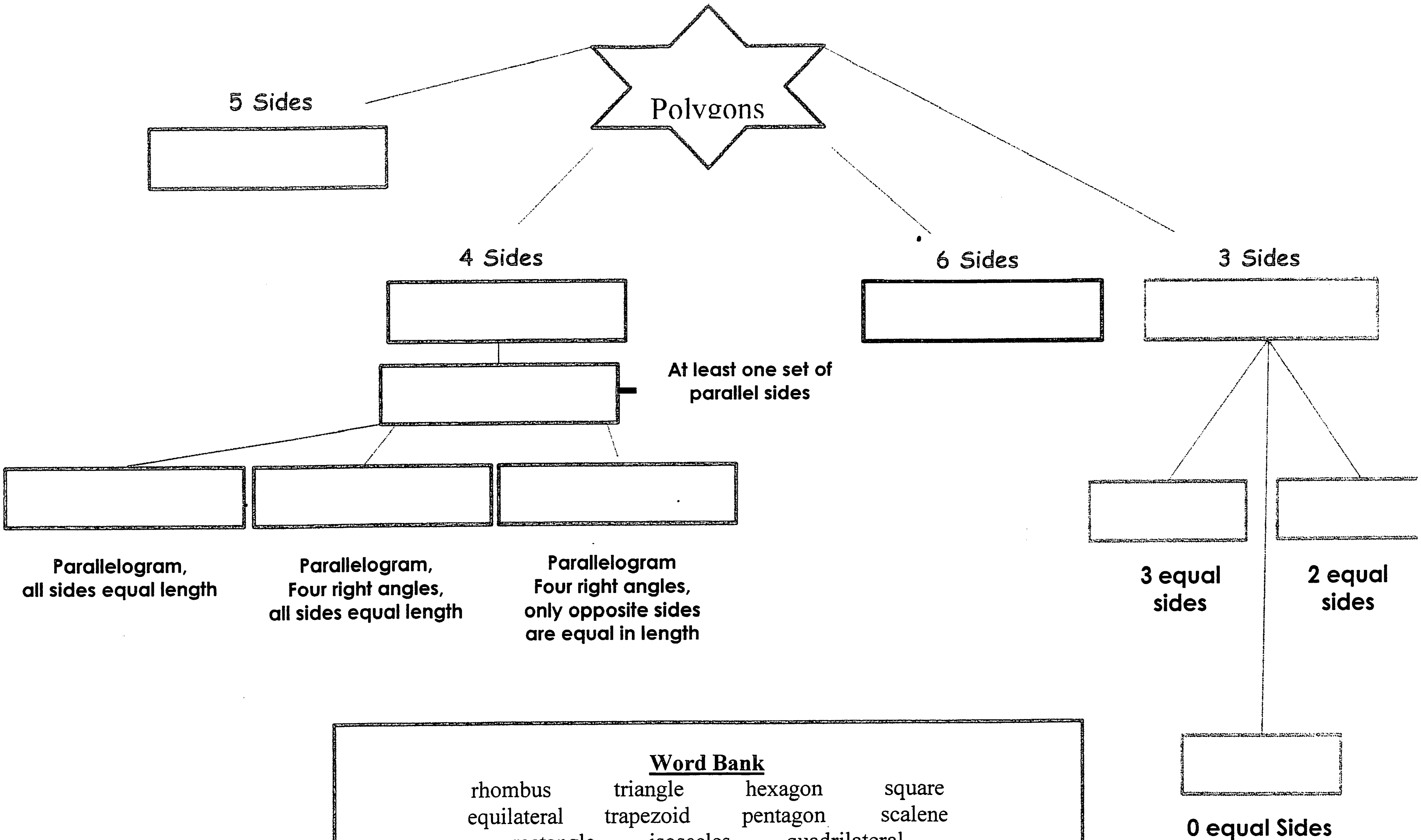
Common Core Georgia Performance Standards Framework
Fifth Grade Mathematics • Unit 6

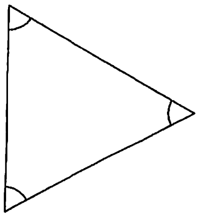
Name ______________________ Date ____________ Class ____________

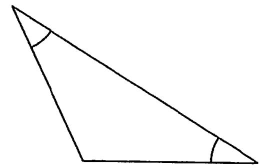


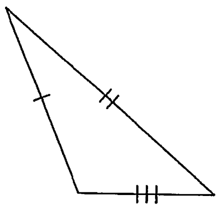
Word Bank

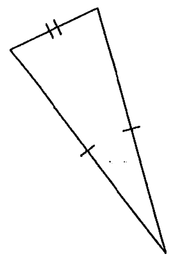
rhombus triangle hexagon square
equilateral trapezoid pentagon scalene
rectangle isosceles quadrilateral

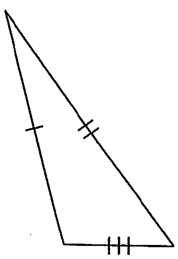
Classify each triangle by its angles and sides.

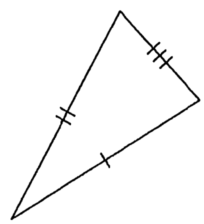
1) 

2) 

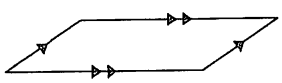
3) 

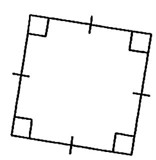
4) 

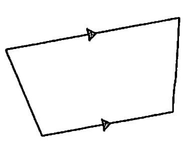
5) 

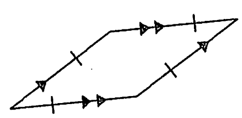
6) 

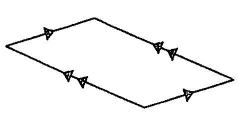
Classify each quadrilateral with ~~the~~ all the names that ~~best~~ describes it.

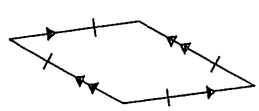
13) 

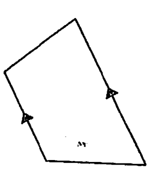
14) 

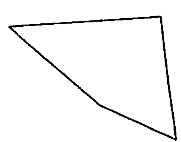
15) 

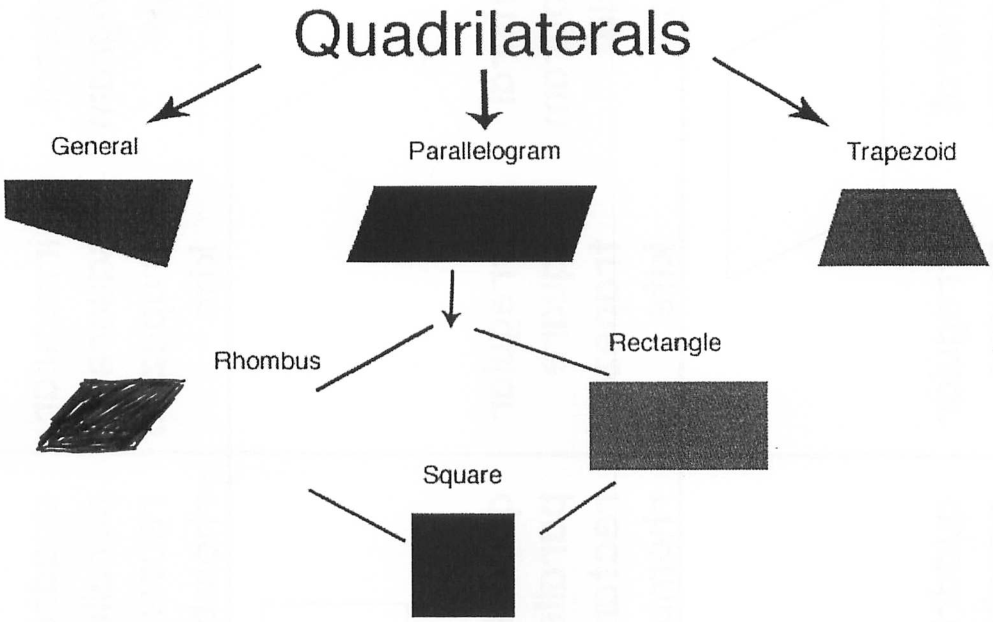
16) 

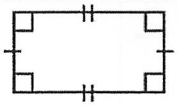
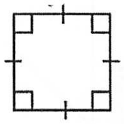
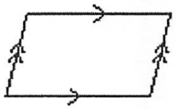
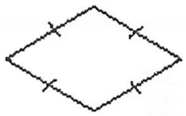
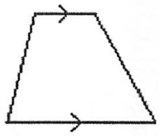
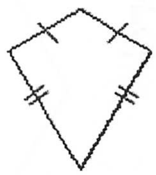
17) 

18) 

19) 

20) 

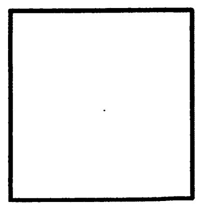


Quadrilateral	*Properties*	
Rectangle	4 right angles and opposite sides equal	
Square	4 right angles and 4 equal sides	
Parallelogram	Two pairs of parallel sides and opposite sides equal	
Rhombus	Parallelogram with 4 equal sides	
Trapezoid	Two sides are parallel	
Kite	Two pairs of adjacent sides of the same length	

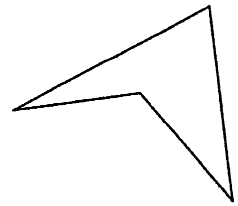
Circle It

each shape below.

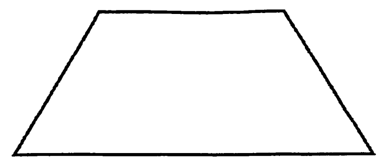
Name: ____________



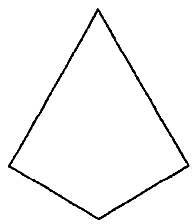
quadrilateral, irregular, parallelogram, square, rectangle, trapezoid, rhombus, kite



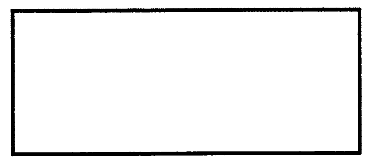
quadrilateral, irregular, parallelogram, square, rectangle, trapezoid, rhombus, kite



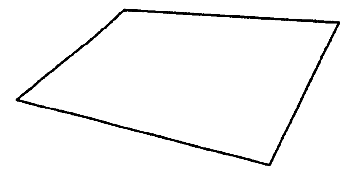
quadrilateral, irregular, parallelogram, square, rectangle, trapezoid, rhombus, kite



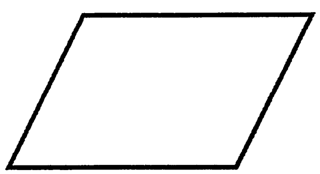
quadrilateral, irregular, parallelogram, square, rectangle, trapezoid, rhombus, kite



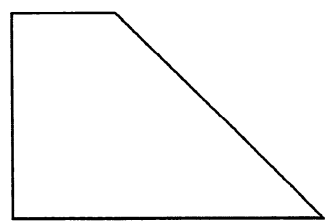
quadrilateral, irregular, parallelogram, square, rectangle, trapezoid, rhombus, kite



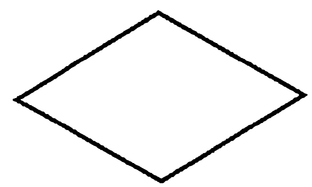
quadrilateral, irregular, parallelogram, square, rectangle, trapezoid, rhombus, kite



quadrilateral, irregular, parallelogram, square, rectangle, trapezoid, rhombus, kite



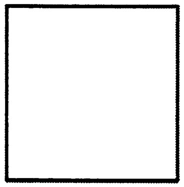
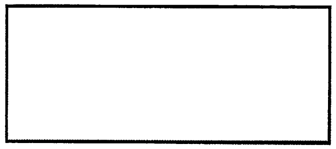
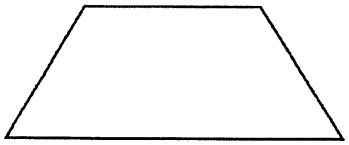
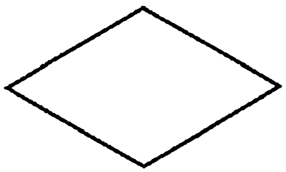
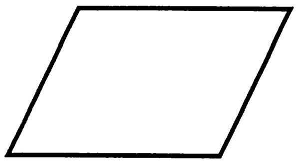
quadrilateral, irregular, parallelogram, square, rectangle, trapezoid, rhombus, kite



quadrilateral, irregular, parallelogram, square, rectangle, trapezoid, rhombus, kite

Describe the Quadrilateral

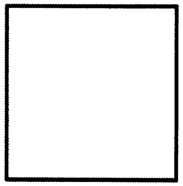
Name: ________________

Shape:	Number of sides of equal length:	Number of sets of parallel lines:	Number of right angles:	Names for this shape:
				
				
				
				
				

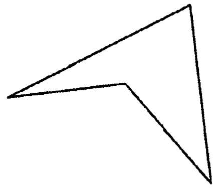
Circle It

Circle all the different names that fit each shape below.

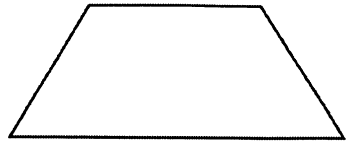
Name: ________________



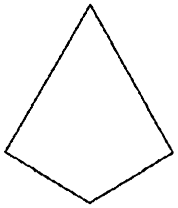
quadrilateral irregular
parallelogram square
rectangle trapezoid
rhombus kite



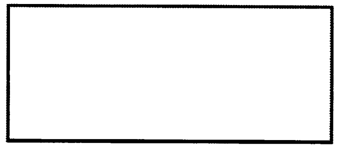
quadrilateral irregular
parallelogram square
rectangle trapezoid
rhombus kite



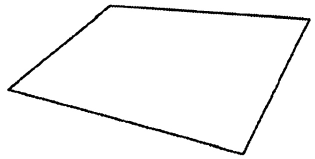
quadrilateral irregular
parallelogram square
rectangle trapezoid
rhombus kite



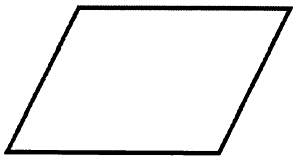
quadrilateral irregular
parallelogram square
rectangle trapezoid
rhombus kite



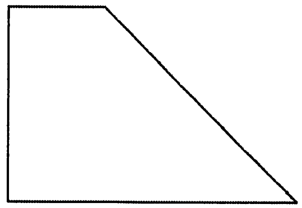
quadrilateral irregular
parallelogram square
rectangle trapezoid
rhombus kite



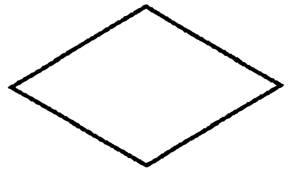
quadrilateral irregular
parallelogram square
rectangle trapezoid
rhombus kite



quadrilateral irregular
parallelogram square
rectangle trapezoid
rhombus kite



quadrilateral irregular
parallelogram square
rectangle trapezoid
rhombus kite



quadrilateral irregular
parallelogram square
rectangle trapezoid
rhombus kite

Classifying Quadrilaterals

Solve each problem below.

1. A square is always a rectangle.

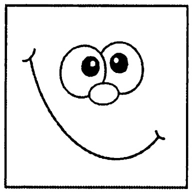
true false

How do you know? ______________

____

____

2. Write three names for this shape:



a. ______________________________

b. ______________________________

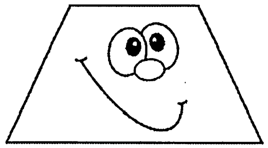
c. ______________________________

3. What makes up a parallelogram?

____

____

4. Circle all of the names for the shape below.



square rhombus polygon
rectangle trapezoid circle
quadrilateral

5. Fill in the chart below.

Shape	Sides	SETS of parallel lines	Vertices
Square			
Parallelogram			
Trapezoid			
Rectangle			

6. Define quadrilateral:

____

____

____

____

____

____

____

7. Write down three real-world examples of quadrilaterals.

1. ________________

2. ________________

3. ________________

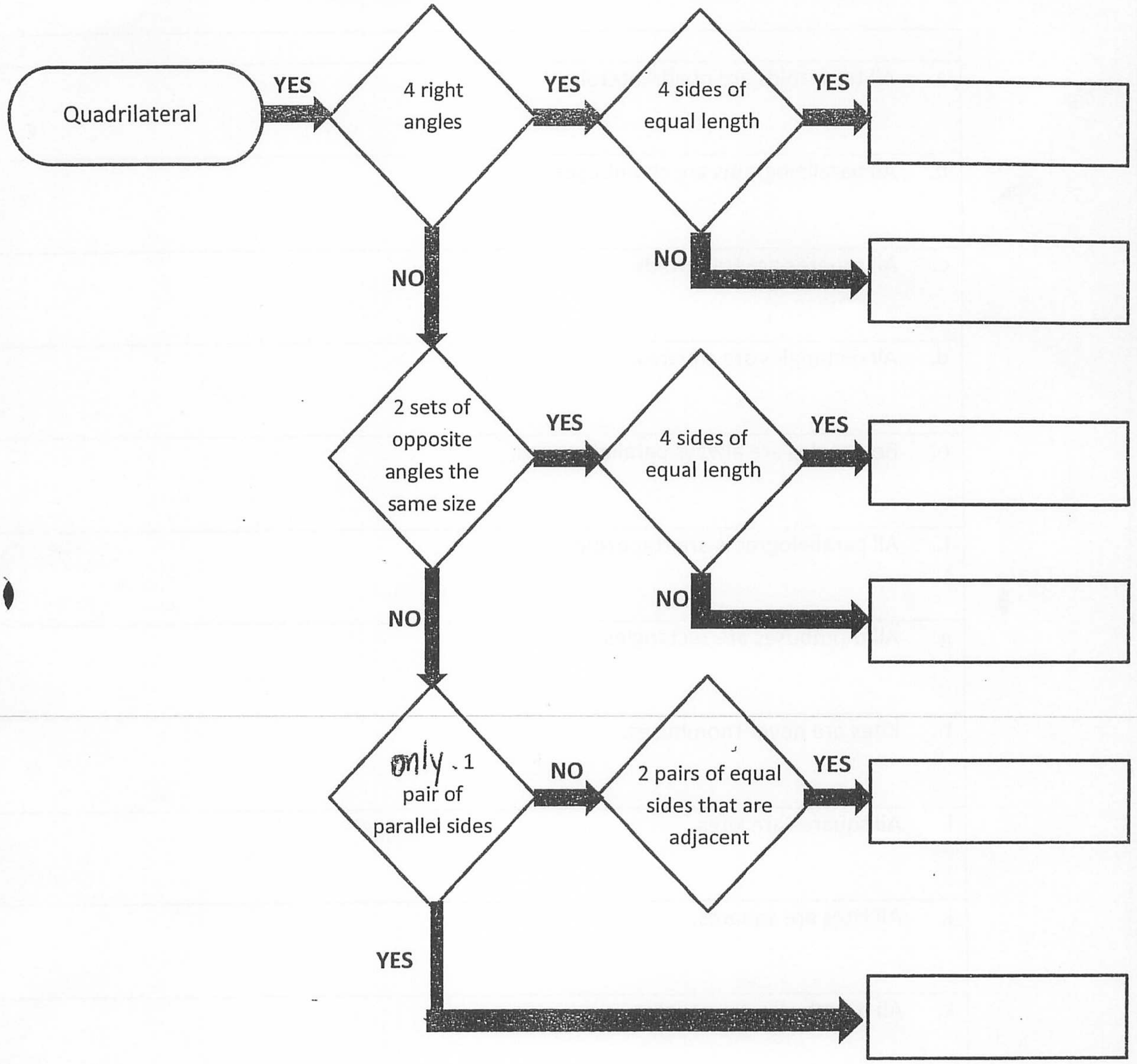
Name ______________________________ Date ______________

1. True or false. If the statement is false, rewrite it to make it true.

	T	F
a. All trapezoids are quadrilaterals.		
b. All parallelograms are rhombuses.		
c. All squares are trapezoids.		
d. All rectangles are squares.		
e. Rectangles are always parallelograms.		
f. All parallelograms are trapezoids.		
g. All rhombuses are rectangles.		
h. Kites are never rhombuses.		
i. All squares are kites.		
j. All kites are squares.		
k. All rhombuses are squares.		

Name ______________________________ Date ______________

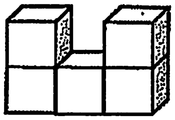
1. Follow the flow chart, and put the name of the figure in the boxes.

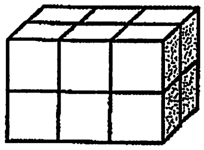


End of Module 5 Review Packet

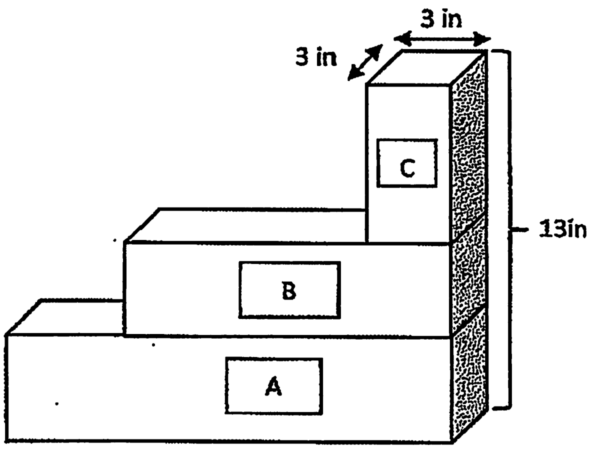
Name____ Date ____________________

1. What is the volume of the figures pictured below?

a. 

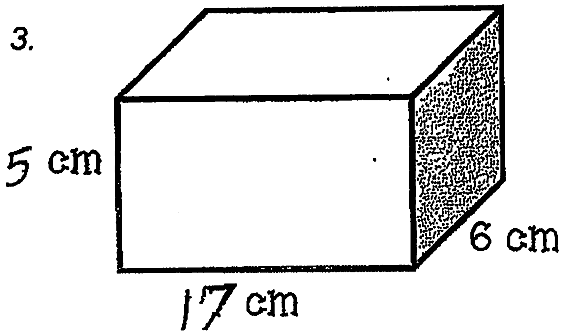
b. 

2. Find the total volume of soil in the three planters. Planter A is 14 inches by 3 inches by 4 inches. Planter B is 9 inches by 3 inches by 3 inches.



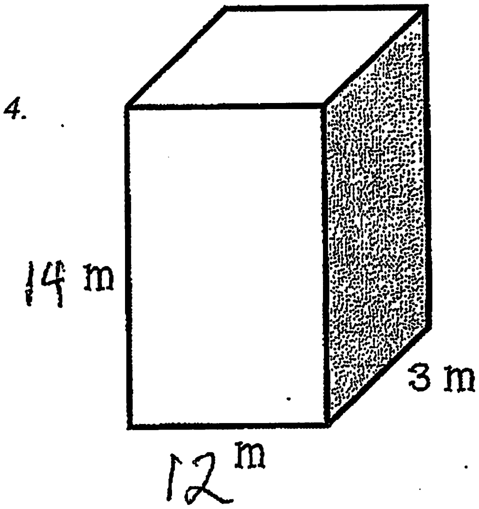
Directions: Find the volume of each rectangular prism.

3.



Volume = ________________

4.



Volume = ________________

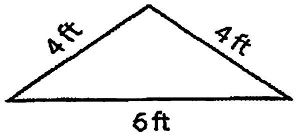
5

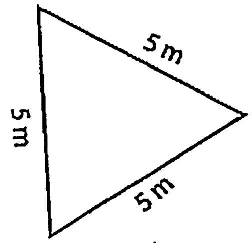
Lindsay packed her old books into a box that was 13 inches in length, 22 inches wide, and 18 inches high. What was the volume of the box?

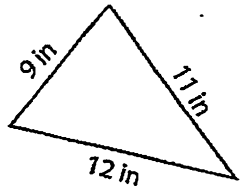
6

Caleb built a planter to plant some flowers. The planter was 4 feet in length, 5 feet wide, and 2 foot high. What was the volume of the planter?

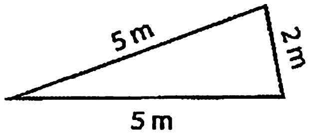
Identify each triangle based on both sides and angles.

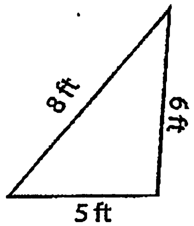


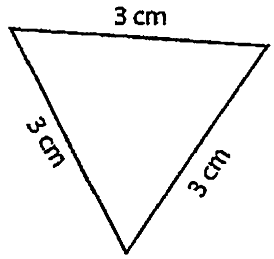




7. ________ 8. ________ 9. ________



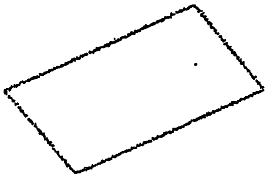




10. ________ 11. ________ 12. ________

Write the names for each shape below.

13.



____

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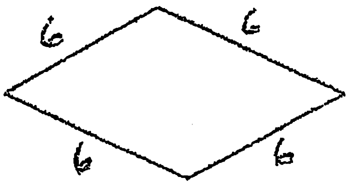
14.



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____

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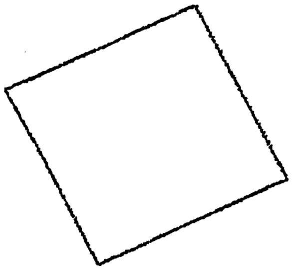
15.



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____

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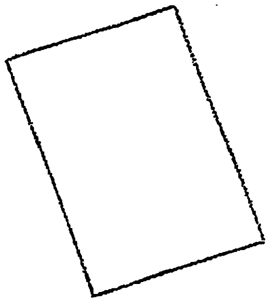
16.



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Geometric Figures Challenge

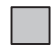
Use your knowledge of geometric shapes to draw and get creative! In your drawing you must use the following shapes and figures at least once. For example, draw a monster with octagon eyes and a triangle nose with strange geometric spots, draw a house with strange patterns in its paint, or a space rocket, etc. Due: Tuesday, April 8th.

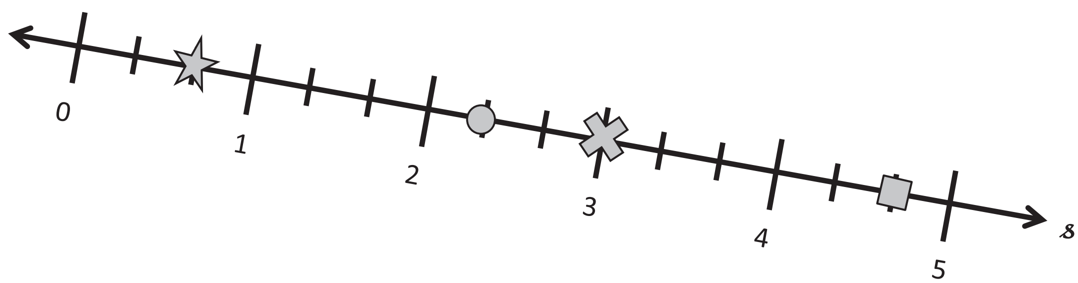
1) right angle
2) obtuse angle
3) acute angle
4) straight angle
5) isosceles triangle
6) scalene triangle
7) equilateral triangle
8) trapezoid
9) parallelogram
10) rhombus
11) square
12) rectangle
13) pentagon
14) hexagon
15) heptagon (septagon)
16) octagon
17) nonagon
18) decagon
19) sphere
20) cone
21) rectangular prism
22) triangular prism
23) cube
24) parallel lines
25) perpendicular lines
26) intersecting lines

Name ____ Date ____________________

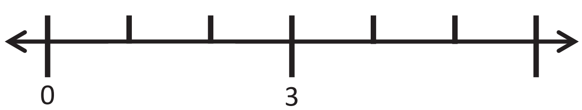
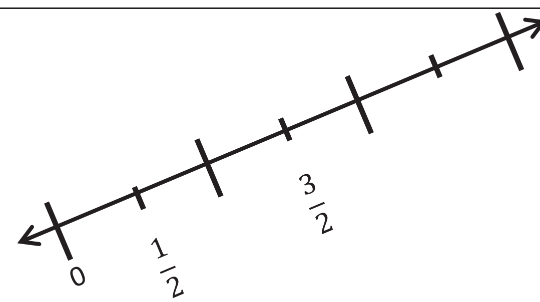
1. Each shape was placed at a point on the number line s. Give the coordinate of each point below.

a.  ______________ b.  ______________

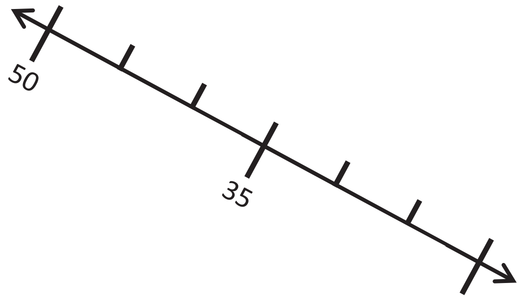
c.  ______________ d.  ______________



2. Plot the points on the number lines.

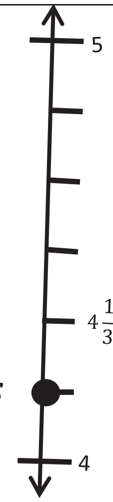
a.	b.
 Plot A so that its distance from the origin is 2.	 Plot R so that its distance from the origin is $\frac{5}{2}$.

c.



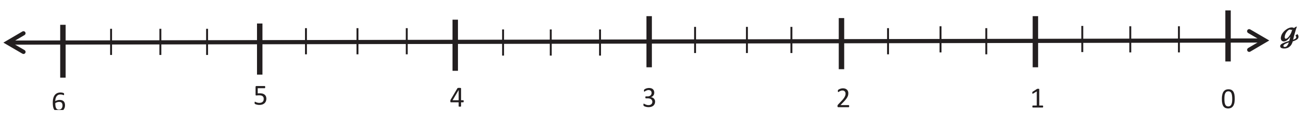
Plot L so that its distance from the origin is 20.

d.



Plot a point T so that its distance from the origin is $\frac{2}{3}$ more than that of S.

3. Number line g is labeled from 0 to 6. Use number line g below to answer the questions.



a. Plot point A at $\frac{3}{4}$.

b. Label a point that lies at $4\frac{1}{2}$ as B.

c. Label a point, C, whose distance from zero is 5 more than that of A.

The coordinate of C is ______________.

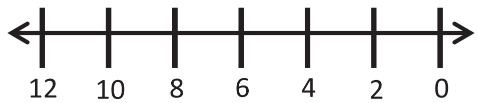
d. Plot a point, D, whose distance from zero is $1\frac{1}{4}$ less than that of B.

The coordinate of D is ______________.

e. The distance of E from zero is $1\frac{3}{4}$ more than that of D. Plot point E.

f. What is the coordinate of the point that lies halfway between A and D? ______________
Label this point F.

4. Mrs. Fan asked her fifth-grade class to create a number line. Lenox created the number line below:



Parks said Lenox's number line is wrong because numbers should always increase from left to right. Who is correct? Explain your thinking.

5. A pirate marked the palm tree on his treasure map and buried his treasure 30 feet away. Do you think he will be able to easily find his treasure when he returns? Why or why not? What might he do to make it easier to find?

Name ________________________________ Date ____________________

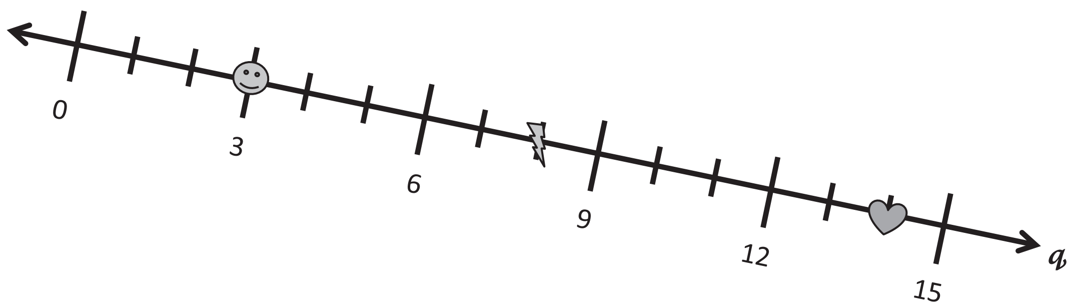
1. Answer the following questions using number line q, below.

   a. What is the coordinate, or the distance from the origin, of the ? ____________

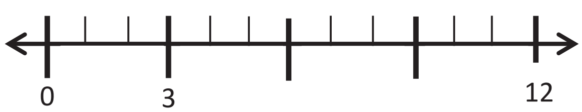
   b. What is the coordinate of the ? ____________

   c. What is the coordinate of the ? ____________

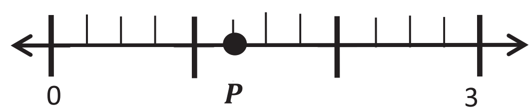
   d. What is the coordinate at the midpoint of the and the ? ____________



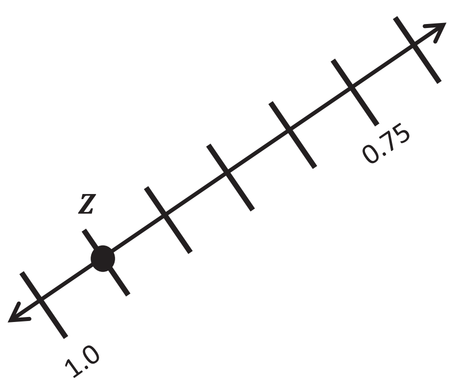
2. Use the number lines to answer the questions.



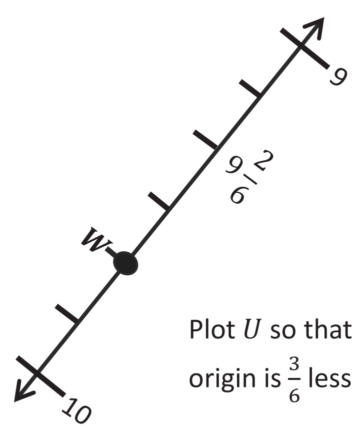
Plot T so that its distance from the origin is 10.



Plot M so that its distance is $\frac{11}{4}$ from the origin. What is the distance from P to M?

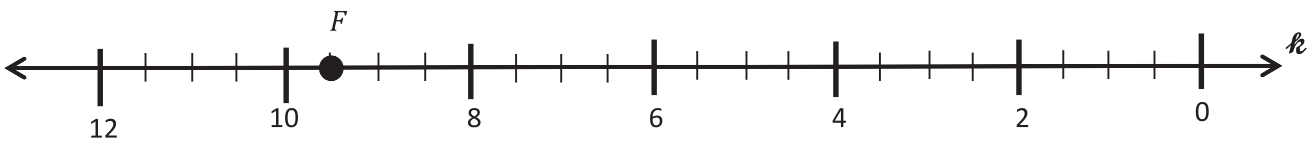


Plot a point that is 0.15 closer to the origin than Z.



Plot U so that its distance from the origin is $\frac{3}{6}$ less than that of W.

3. Number line k shows 12 units. Use number line k below to answer the questions.



a. Plot a point at 1. Label it A.

b. Label a point that lies at $3\frac{1}{2}$ as B.

c. Label a point, C, whose distance from zero is 8 units farther than that of B.

The coordinate of C is __________.

d. Plot a point, D, whose distance from zero is $\frac{6}{2}$ less than that of B.

The coordinate of D is __________.

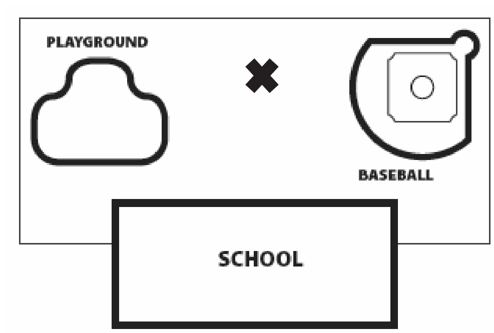
e. What is the coordinate of the point that lies $\frac{17}{2}$ farther from the origin than D?

Label this point E.

f. What is the coordinate of the point that lies halfway between F and D?

Label this point G.

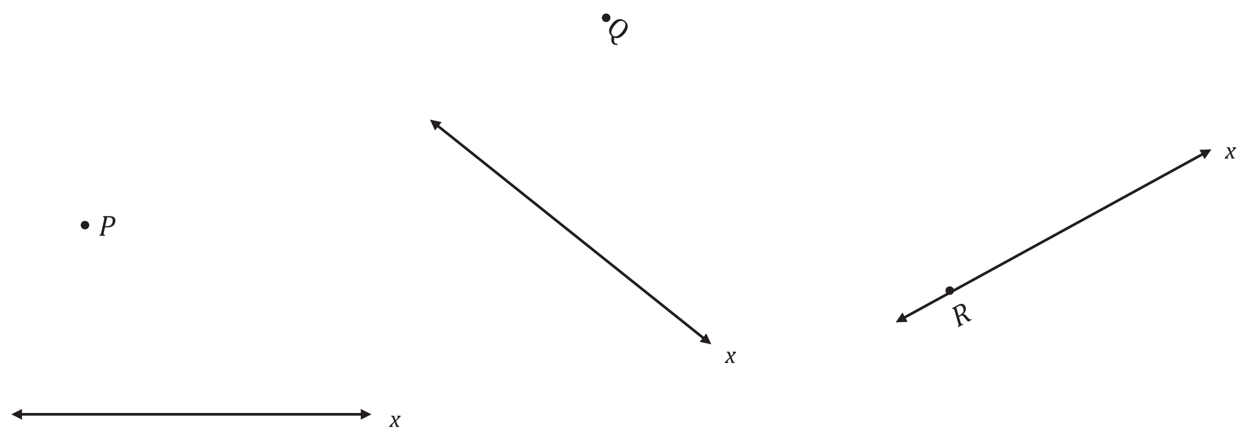
4. Mr. Baker's fifth-grade class buried a time capsule in the field behind the school. They drew a map and marked the location of the capsule with an ✖ so that his class can dig it up in ten years. What could Mr. Baker's class have done to make the capsule easier to find?



Name ______________________________ Date ________________

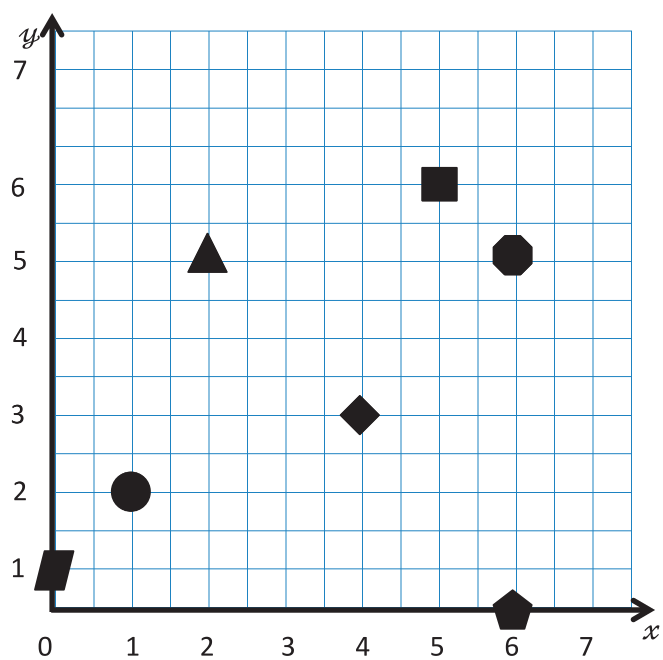
1.

a. Use a set square to draw a line perpendicular to the x-axes through points P, Q, and R. Label the new line as the y-axis.



a. Choose one of the sets of perpendicular lines above, and create a coordinate plane. Mark 7 units on each axis, and label them as whole numbers.

2. Use the coordinate plane to answer the following.



a. Name the shape at each location.

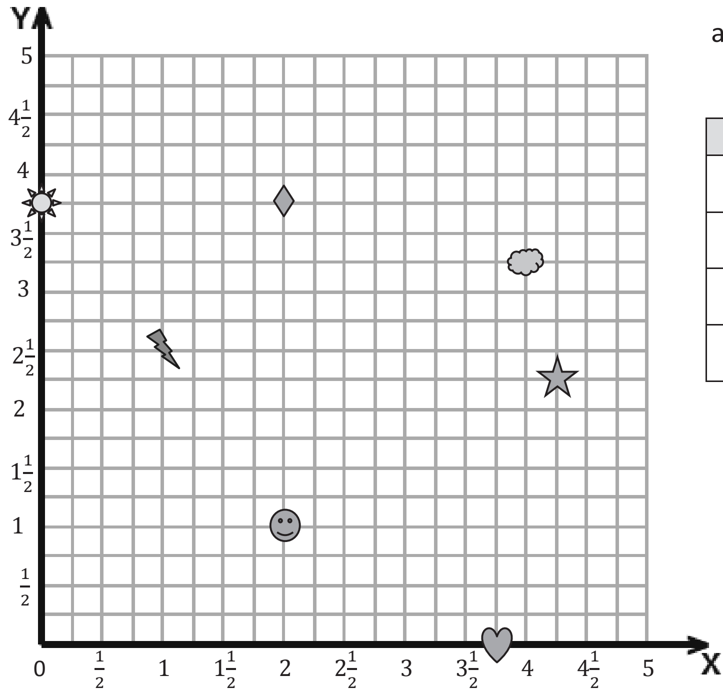
x-coordinate	y-coordinate	Shape
2	5	
1	2	
5	6	
6	5	

b. Which shape is 2 units from the y-axis?

c. Which shape has an x-coordinate of 0?

d. Which shape is 4 units from the y-axis and 3 units from the x-axis?

3. Use the coordinate plane to answer the following.



a. Fill in the blanks.

Shape	x-coordinate	y-coordinate
Smiley Face		
Diamond		
Sun		
Heart		

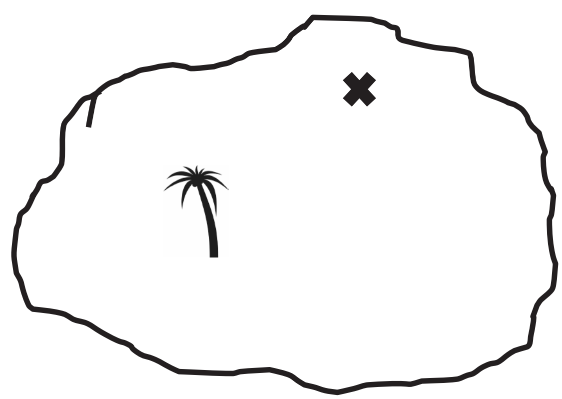
b. Name the shape whose x-coordinate is $\frac{1}{2}$ more than the value of the heart's x-coordinate.

c. Plot a triangle at (3, 4).

d. Plot a square at ($4\frac{3}{4}$, 5).

e. Plot an X at ($\frac{1}{2}$, $\frac{3}{4}$).

4. The pirate's treasure is buried at the ✖ on the map. How could a coordinate plane make describing its location easier?



Name ____ Date ______________________

1.

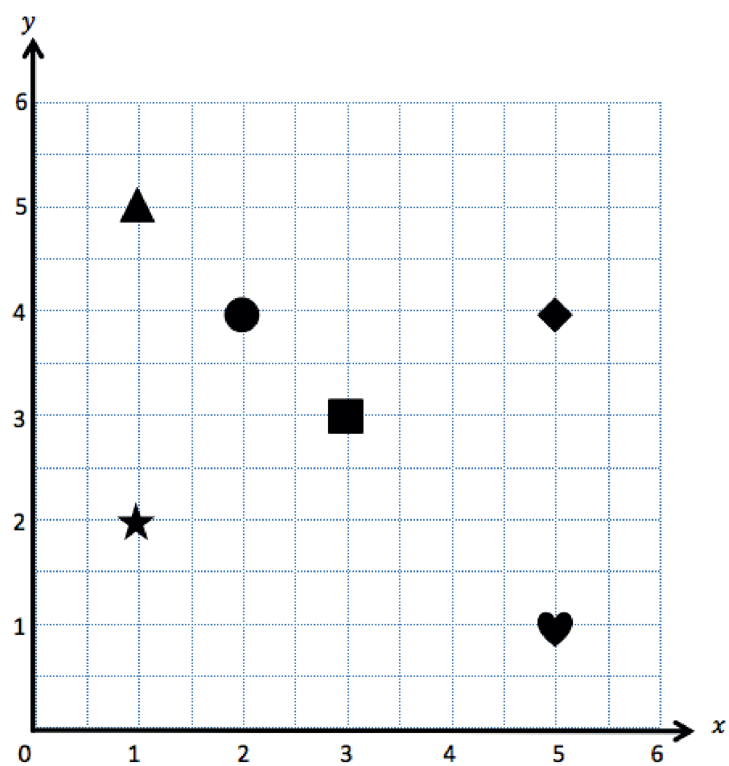
a. Use a set square to draw a line perpendicular to the x-axis through point P. Label the new line as the y-axis.

b. Choose one of the sets of perpendicular lines above, and create a coordinate plane. Mark 5 units on each axis, and label them as whole numbers.

2. Use the coordinate plane to answer the following.

a. Name the shape at each location.

x-coordinate	y-coordinate	Shape
2	4	
5	4	
1	5	
5	1	



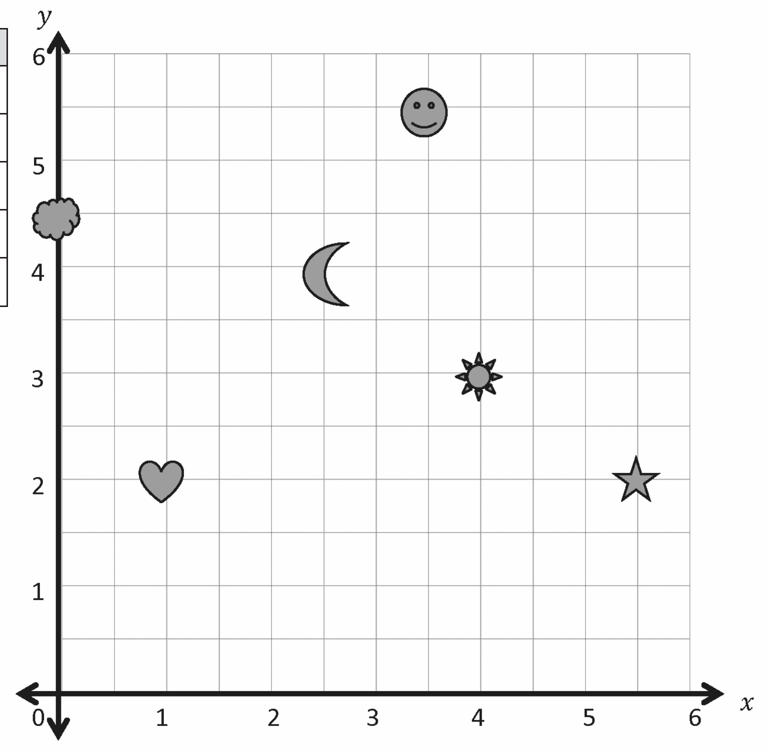
b. Which shape is 2 units from the x-axis?

c. Which shape has the same x- and y-coordinate?

3. Use the coordinate plane to answer the following.

   a. Name the coordinates of each shape.

Shape	x-coordinate	y-coordinate
Moon		
Sun		
Heart		
Cloud		
Smiley Face		



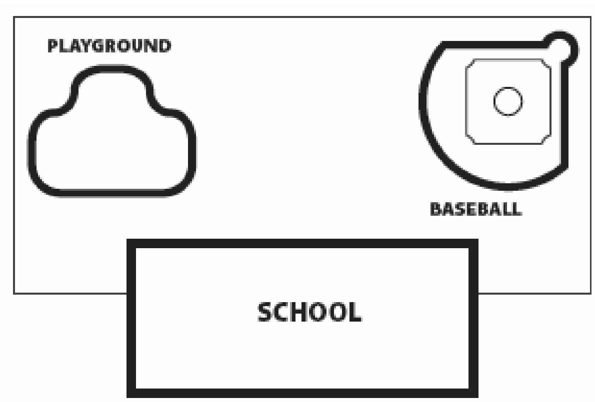
   b. Which 2 shapes have the same y-coordinate?

   c. Plot an X at (2, 3).

   d. Plot a square at $(3, 2\frac{1}{2})$.

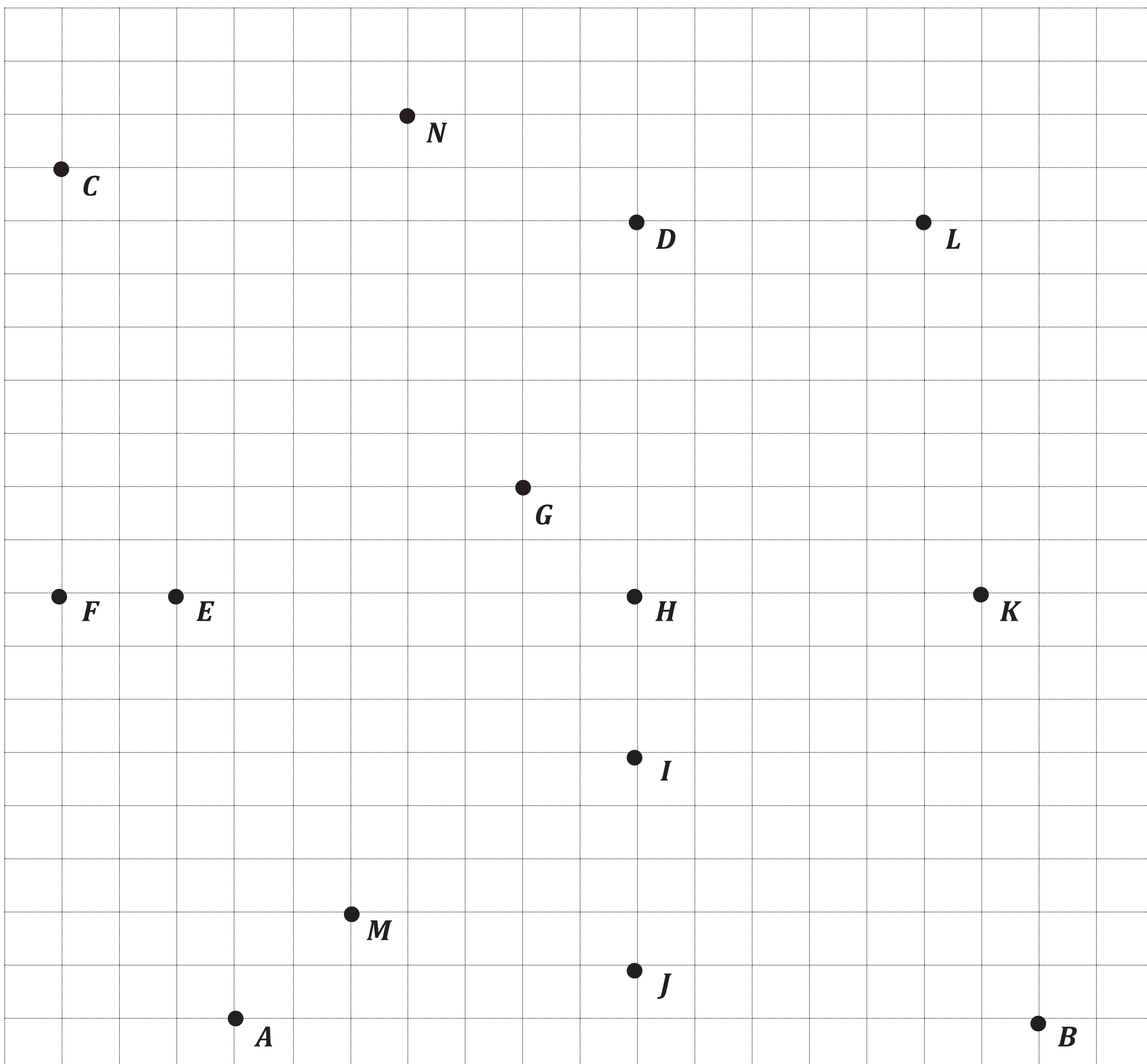
   e. Plot a triangle at $(6, 3\frac{1}{2})$.

4. Mr. Palmer plans to bury a time capsule 10 yards behind the school. What else should he do to make naming the location of the time capsule more accurate?



Name ______________________________ Date ________________

1. Use the grid below to complete the following tasks.
   a. Construct an x-axis that passes through points A and B.
   b. Construct a perpendicular y-axis that passes through points C and F.
   c. Label the origin as 0.
   d. The x-coordinate of B is $5\frac{2}{3}$. Label the whole numbers along the x-axis.
   e. The y-coordinate of C is $5\frac{1}{3}$. Label the whole numbers along the y-axis.



2. For all of the following problems, consider the points A through N on the previous page.

   a. Identify all of the points that have an x-coordinate of $3\frac{1}{3}$.

   b. Identify all of the points that have a y-coordinate of $2\frac{2}{3}$.

   c. Which point is $3\frac{1}{3}$ units above the x-axis *and* $2\frac{2}{3}$ units to the right of the y-axis? Name the point, and give its coordinate pair.

   d. Which point is located $5\frac{1}{3}$ units from the y-axis?

   e. Which point is located $1\frac{2}{3}$ units along the x-axis?

   f. Give the coordinate pair for each of the following points.

      K: ________ I: ________ B: ________ C: ________

   g. Name the points located at the following coordinates.

      $(1\frac{2}{3}, \frac{2}{3})$ _______ $(0, 2\frac{2}{3})$ _______ $(1, 0)$ _______ $(2, 5\frac{2}{3})$ _______

   h. Which point has an equal x- and y-coordinate? ________

   i. Give the coordinates for the intersection of the two axes. (_____ , _____) Another name for this point on the plane is the ____________.

   j. Plot the following points.

      P: $(4\frac{1}{3}, 4)$ Q: $(\frac{1}{3}, 6)$ R: $(4\frac{2}{3}, 1)$ S: $(0, 1\frac{2}{3})$

   k. What is the distance between E and H, or EH?

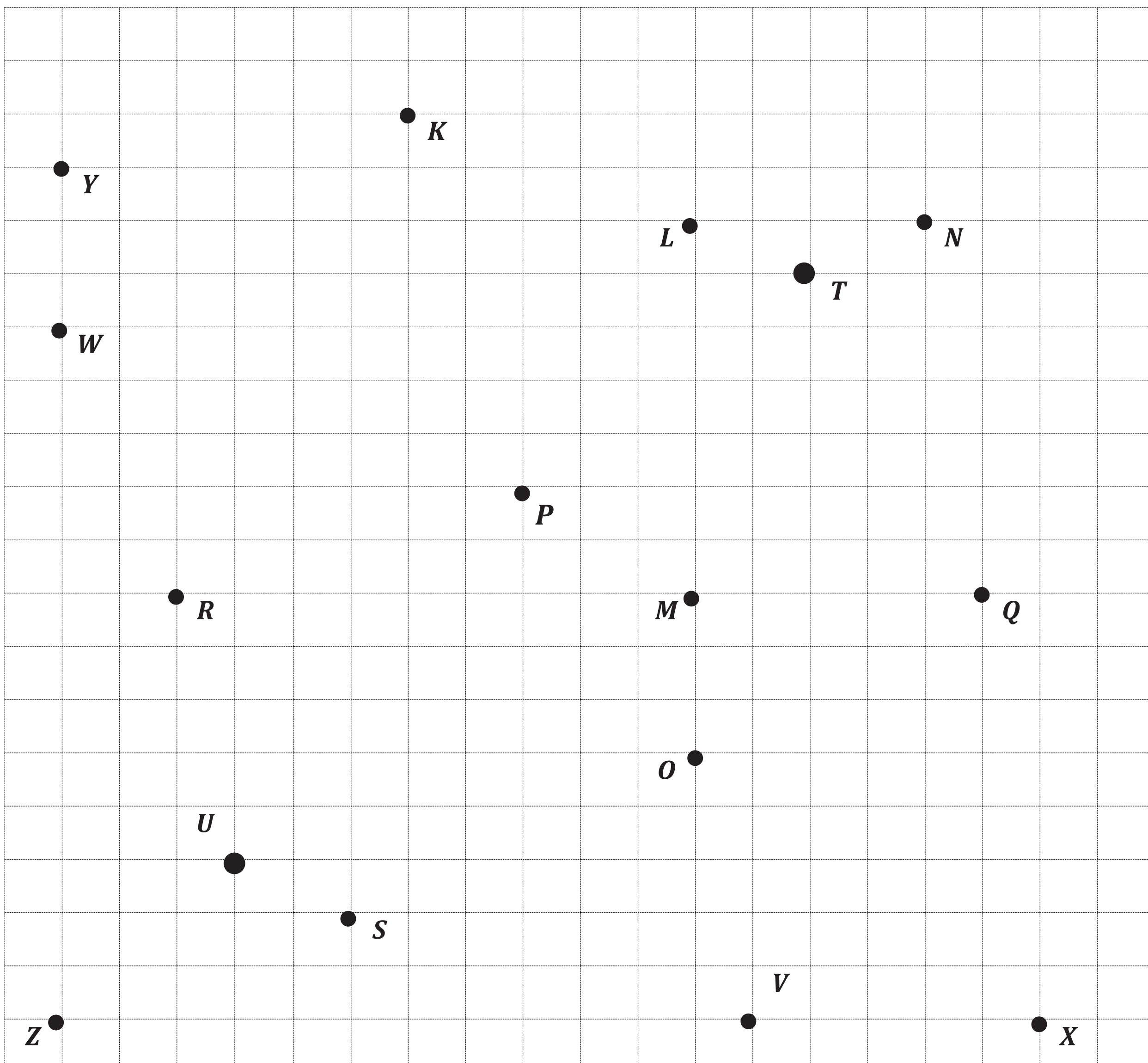
l. What is the length of HD?

m. Would the length of ED be greater or less than $EH + HD$?

n. Jack was absent when the teacher explained how to describe the location of a point on the coordinate plane. Explain it to him using point J.

Name ______________________________ Date ________________

1. Use the grid below to complete the following tasks.
   a. Construct a y-axis that passes through points Y and Z.
   b. Construct a perpendicular x-axis that passes through points Z and X.
   c. Label the origin as 0.
   d. The y-coordinate of W is $2\frac{3}{5}$. Label the whole numbers along the y-axis.
   e. The x-coordinate of V is $2\frac{2}{5}$. Label the whole numbers along the x-axis.



2. For all of the following problems, consider the points K through X on the previous page.

a. Identify all of the points that have a y-coordinate of $1\frac{3}{5}$.

b. Identify all of the points that have an x-coordinate of $2\frac{1}{5}$.

c. Which point is $1\frac{3}{5}$ units above the x-axis *and* $3\frac{1}{5}$ units to the right of the y-axis? Name the point, and give its coordinate pair.

d. Which point is located $1\frac{1}{5}$ units from the y-axis?

e. Which point is located $\frac{2}{5}$ unit along the x-axis?

f. Give the coordinate pair for each of the following points.

T: ________ U: ________ S: ________ K: ________

g. Name the points located at the following coordinates.

$(\frac{3}{5}, \frac{3}{5})$ _______ $(3\frac{2}{5}, 0)$ _______ $(2\frac{1}{5}, 3)$ _______ $(0, 2\frac{3}{5})$ _______

h. Plot a point whose x- and y-coordinates are equal. Label your point E.

i. What is the name for the point on the plane where the two axes intersect? ___________

Give the coordinates for this point. (_____ , _____)

j. Plot the following points.

A: $(1\frac{1}{5}, 1)$ B: $(\frac{1}{5}, 3)$ C: $(2\frac{4}{5}, 2\frac{2}{5})$ D: $(1\frac{1}{5}, 0)$

k. What is the distance between L and N, or LN?

l. What is the distance of MQ?

m. Would RM be greater than, less than, or equal to $LN + MQ$?

n. Leslie was explaining how to plot points on the coordinate plane to a new student, but she left off some important information. Correct her explanation so that it is complete.

"All you have to do is read the coordinates; for example, if it says (4, 7), count four, then seven, and put a point where the two grid lines intersect."

Battleship Rules

Goal: To sink all of your opponent's ships by correctly guessing their coordinates.

Materials

- 1 grid sheet (per person/per game)
- Red crayon/marker for hits
- Black crayon/marker for misses
- Folder to place between players

Ships

- Each player must mark 5 ships on the grid.
  - Aircraft carrier—plot 5 points.
  - Battleship—plot 4 points.
  - Cruiser—plot 3 points.
  - Submarine—plot 3 points.
  - Patrol boat—plot 2 points.

Setup

- With your opponent, choose a unit length and fractional unit for the coordinate plane.
- Label the chosen units on both grid sheets.
- Secretly select locations for each of the 5 ships on your My Ships grid.
  - All ships must be placed horizontally or vertically on the coordinate plane.
  - Ships can touch each other, but they may not occupy the same coordinate.

Play

- Players take turns firing one shot to attack enemy ships.
- On your turn, call out the coordinates of your attacking shot. Record the coordinates of each attack shot.
- Your opponent checks his/her My Ships grid. If that coordinate is unoccupied, your opponent says, "Miss." If you named a coordinate occupied by a ship, your opponent says, "Hit."
- Mark each attempted shot on your Enemy Ships grid. Mark a black ✖ on the coordinate if your opponent says, "Miss." Mark a red ✓ on the coordinate if your opponent says, "Hit."
- On your opponent's turn, if he/she hits one of your ships, mark a red ✓ on that coordinate of your My Ships grid. When one of your ships has every coordinate marked with a ✓, say, "You've sunk my [name of ship]."

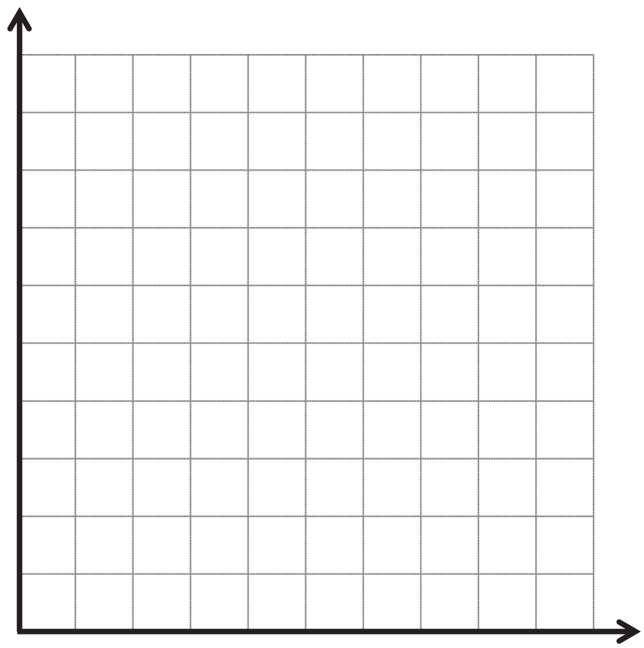
Victory

- The first player to sink all (or the most) opposing ships, wins.

My Ships

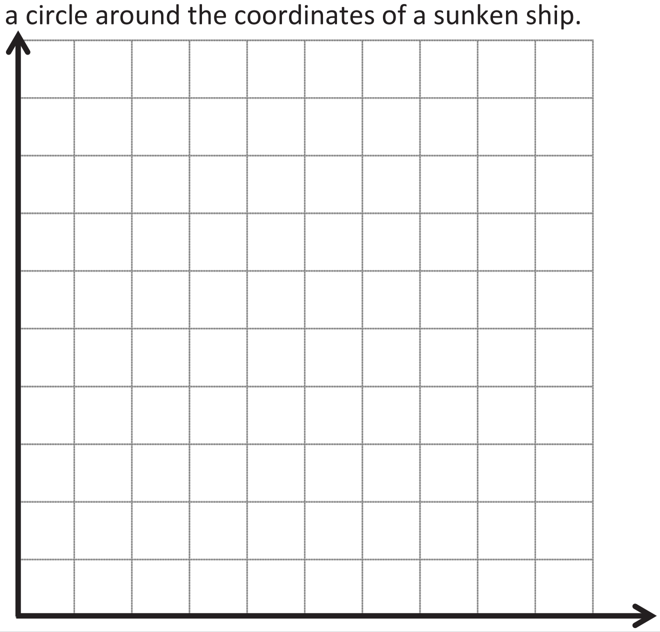
- Draw a red ✓ over any coordinate your opponent hits.
- Once all of the coordinates of any ship have been hit, say, "You've sunk my [name of ship]."

Aircraft carrier—5 points
Battleship—4 points
Cruiser—3 points
Submarine—3 points
Patrol boat—2 points



Enemy Ships

- Draw a black ✖ on the coordinate if your opponent says, "Miss."
- Draw a red ✓ on the coordinate if your opponent says, "Hit."
- Draw a circle around the coordinates of a sunken ship.



Attack Shots

- Record the coordinates of each shot below and whether it was a ✓(hit) or an ✖ (miss).

(______ , ______)   (______ , ______)

(______ , ______)   (______ , ______)

(______ , ______)   (______ , ______)

(______ , ______)   (______ , ______)

(______ , ______)   (______ , ______)

(______ , ______)   (______ , ______)

(______ , ______)   (______ , ______)

(______ , ______)   (______ , ______)

Name ____ Date ______________________

Your homework is to play at least one game of Battleship with a friend or family member. You can use the directions from class to teach your opponent. You and your opponent should record your guesses, hits, and misses on the sheet as you did in class.

When you have finished your game, answer these questions.

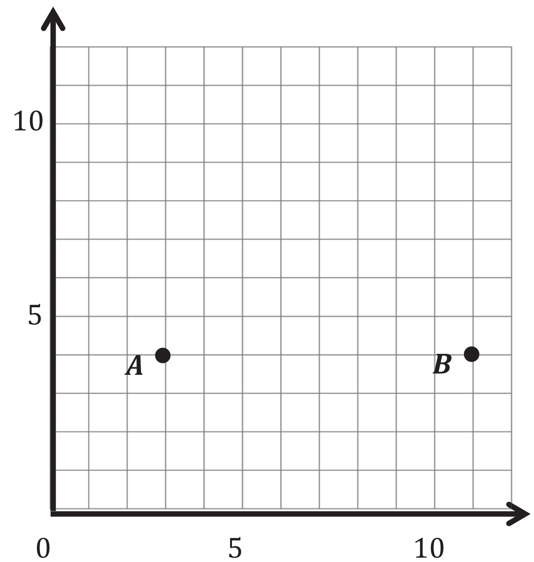
1. When you guess a point that is a hit, how do you decide which points to guess next?

2. How could you change the coordinate plane to make the game easier or more challenging?

3. Which strategies worked best for you when playing this game?

Name ______________________________ Date ______________

1. Use the coordinate plane to the right to answer the following questions.



   a. Use a straightedge to construct a line that goes through points A and B. Label the line e.

   b. Line e is parallel to the ______-axis and is perpendicular to the ______-axis.

   c. Plot two more points on line e. Name them C and D.

   d. Give the coordinates of each point below.

   A: ________ B: ________

   C: ________ D: ________

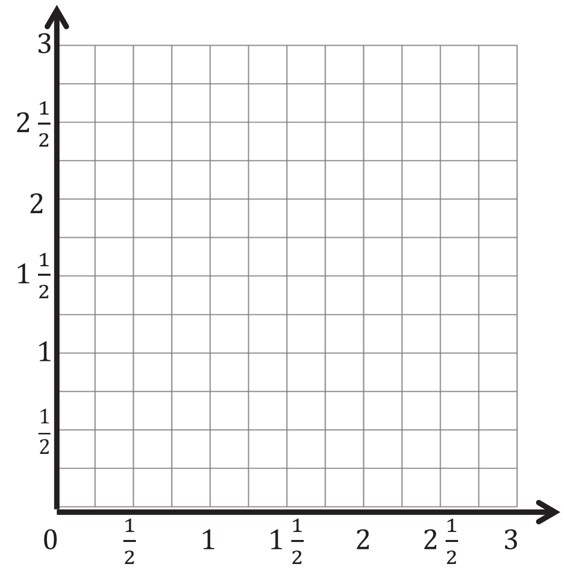
   e. What do all of the points of line e have in common?

   f. Give the coordinates of another point that would fall on line e with an x-coordinate greater than 15.

2. Plot the following points on the coordinate plane to the right.

P: $(1\frac{1}{2}, \frac{1}{2})$ Q: $(1\frac{1}{2}, 2\frac{1}{2})$

R: $(1\frac{1}{2}, 1\frac{1}{4})$ S: $(1\frac{1}{2}, \frac{3}{4})$



a. Use a straightedge to draw a line to connect these points. Label the line $\hbar$.

b. In line $\hbar$, x = _____ for all values of y.

c. Circle the correct word.

Line $\hbar$ is *parallel* *perpendicular* to the x-axis.

Line $\hbar$ is *parallel* *perpendicular* to the y-axis.

d. What pattern occurs in the coordinate pairs that let you know that line $\hbar$ is vertical?

3. For each pair of points below, think about the line that joins them. For which pairs is the line parallel to the x-axis? Circle your answer(s). Without plotting them, explain how you know.

a. (1.4, 2.2) and (4.1, 2.4) b. (3, 9) and (8, 9) c. $(1\frac{1}{4}, 2)$ and $(1\frac{1}{4}, 8)$

4. For each pair of points below, think about the line that joins them. For which pairs is the line parallel to the y-axis? Circle your answer(s). Then, give 2 other coordinate pairs that would also fall on this line.

a. (4, 12) and (6, 12) b. $(\frac{3}{5}, 2\frac{3}{5})$ and $(\frac{1}{5}, 3\frac{1}{5})$ c. (0.8, 1.9) and (0.8, 2.3)

5. Write the coordinate pairs of 3 points that can be connected to construct a line that is $5\frac{1}{2}$ units to the right of and parallel to the y-axis.

a. ________________ b. ________________ c. ________________

6. Write the coordinate pairs of 3 points that lie on the x-axis.

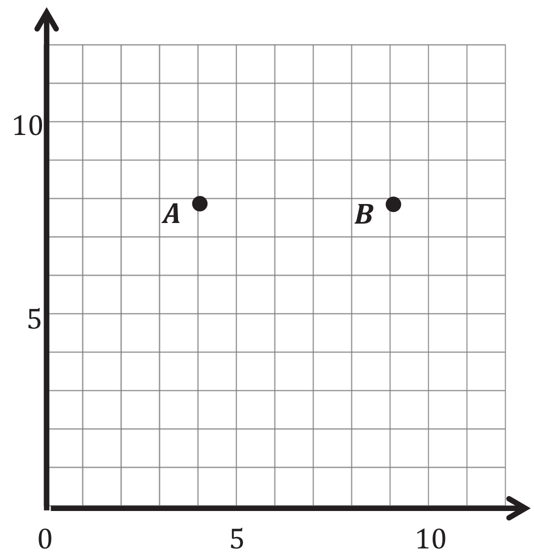
a. ________________ b. ________________ c. ________________

7. Adam and Janice are playing Battleship. Presented in the table is a record of Adam's guesses so far.
He has hit Janice's battleship using these coordinate pairs. What should he guess next? How do you know? Explain using words and pictures.

(3, 11)	hit
(2, 11)	miss
(3, 10)	hit
(4, 11)	miss
(3, 9)	miss

Name ______________________________ Date ________________

1. Use the coordinate plane to answer the questions.



   a. Use a straightedge to construct a line that goes through points A and B. Label the line g.

   b. Line g is parallel to the ______-axis and is perpendicular to the ______-axis.

   c. Draw two more points on line g. Name them C and D.

   d. Give the coordinates of each point below.

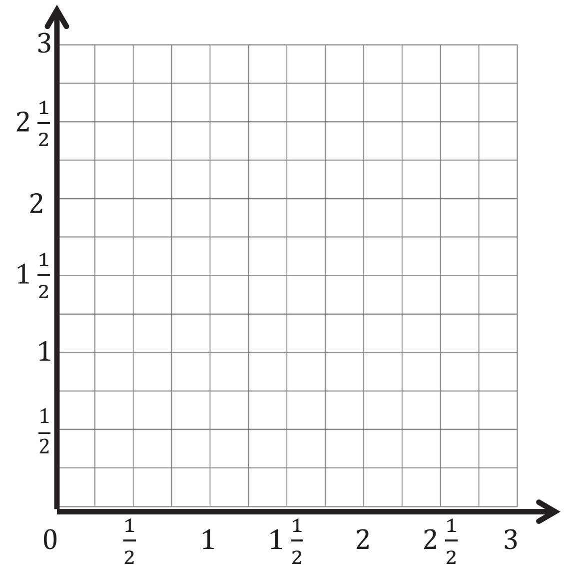
      A: ________ B: ________

      C: ________ D: ________

   e. What do all of the points on line g have in common?

   f. Give the coordinates of another point that falls on line g with an x-coordinate greater than 25.

2. Plot the following points on the coordinate plane to the right.



H: $(\frac{3}{4}, 3)$ I: $(\frac{3}{4}, 2\frac{1}{4})$

J: $(\frac{3}{4}, \frac{1}{2})$ K: $(\frac{3}{4}, 1\frac{3}{4})$

a. Use a straightedge to draw a line to connect these points. Label the line $\mathcal{f}$.

b. In line $\mathcal{f}$, x = ______ for all values of y.

c. Circle the correct word:

Line $\mathcal{f}$ is *parallel* *perpendicular* to the x-axis.

Line $\mathcal{f}$ is *parallel* *perpendicular* to the y-axis.

d. What pattern occurs in the coordinate pairs that make line $\mathcal{f}$ vertical?

3. For each pair of points below, think about the line that joins them. For which pairs is the line parallel to the x-axis? Circle your answer(s). Without plotting them, explain how you know.

a. (3.2, 7) and (5, 7) b. (8, 8.4) and (8, 8.8) c. $(6\frac{1}{2}, 12)$ and (6.2, 11)

4. For each pair of points below, think about the line that joins them. For which pairs is the line parallel to the y-axis? Circle your answer(s). Then, give 2 other coordinate pairs that would also fall on this line.

a. (3.2, 8.5) and (3.22, 24) b. $(13\frac{1}{3}, 4\frac{2}{3})$ and $(13\frac{1}{3}, 7)$ c. (2.9, 5.4) and (7.2, 5.4)

5. Write the coordinate pairs of 3 points that can be connected to construct a line that is $5\frac{1}{2}$ units to the right of and parallel to the y-axis.

a. ________________ b. ________________ c. ________________

6. Write the coordinate pairs of 3 points that lie on the y-axis.

a. ________________ b. ________________ c. ________________

7. Leslie and Peggy are playing Battleship on axes labeled in halves. Presented in the table is a record of Peggy's guesses so far. What should she guess next? How do you know? Explain using words and pictures.

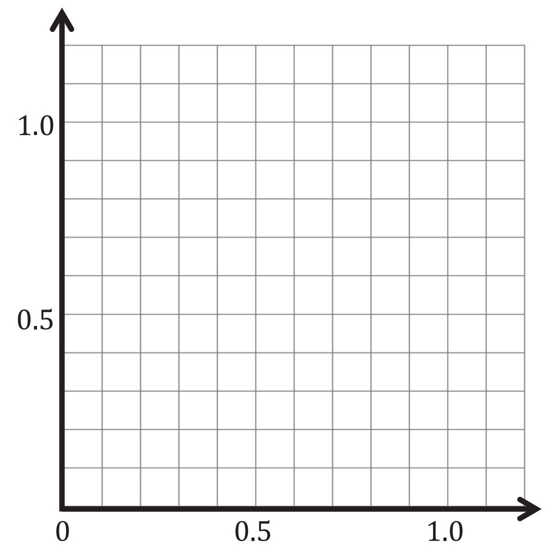
(5, 5)	miss
(4, 5)	hit
$(3\frac{1}{2}, 5)$	miss
$(4\frac{1}{2}, 5)$	miss

Name ____ Date ______________________

1. Plot the following points, and label them on the coordinate plane.

A: (0.3, 0.1) B: (0.3, 0.7)

C: (0.2, 0.9) D: (0.4, 0.9)



a. Use a straightedge to construct line segments $\overline{AB}$ and $\overline{CD}$.

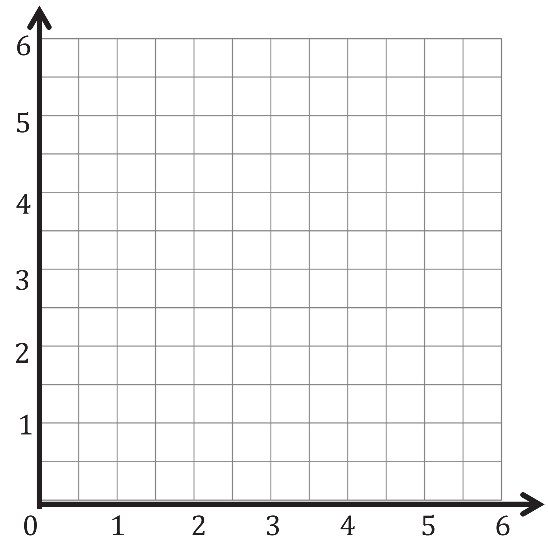
b. Line segment _________ is parallel to the x-axis and is perpendicular to the y-axis.

c. Line segment _________ is parallel to the y-axis and is perpendicular to the x-axis.

d. Plot a point on line segment $\overline{AB}$ that is not at the endpoints, and name it U. Write the coordinates. U (_____ , _____)

e. Plot a point on line segment $\overline{CD}$, and name it V. Write the coordinates. V (_____ , _____)

2. Construct line f such that the y-coordinate of every point is $3\frac{1}{2}$, and construct line g such that the x-coordinate of every point is $4\frac{1}{2}$.



a. Line f is ________ units from the x-axis.

b. Give the coordinates of the point on line f that is $\frac{1}{2}$ unit from the y-axis. ________

c. With a blue pencil, shade the portion of the grid that is less than $3\frac{1}{2}$ units from the x-axis.

d. Line g is _________ units from the y-axis.

e. Give the coordinates of the point on line g that is 5 units from the x-axis. ________

f. With a red pencil, shade the portion of the grid that is more than $4\frac{1}{2}$ units from the y-axis.

3. Complete the following tasks on the plane below.

   a. Construct a line m that is perpendicular to the x-axis and 3.2 units from the y-axis.

   b. Construct a line a that is 0.8 unit from the x-axis.

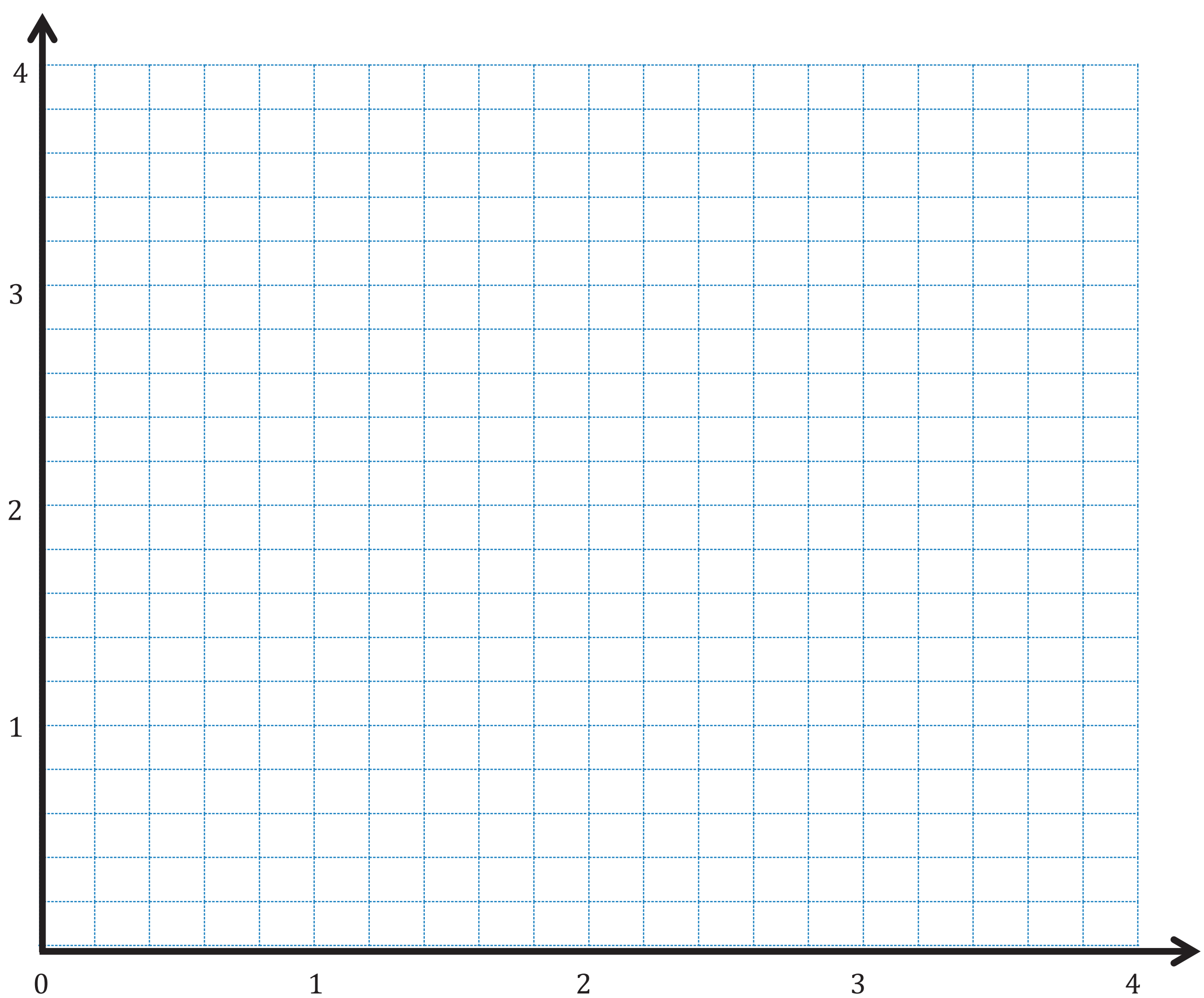
   c. Construct a line t that is parallel to line m and is halfway between line m and the y-axis.

   d. Construct a line h that is perpendicular to line t and passes through the point (1.2, 2.4).

   e. Using a blue pencil, shade the region that contains points that are more than 1.6 units and less than 3.2 units from the y-axis.

   f. Using a red pencil, shade the region that contains points that are more than 0.8 unit and less than 2.4 units from the x-axis.

   g. Give the coordinates of a point that lies in the double-shaded region.

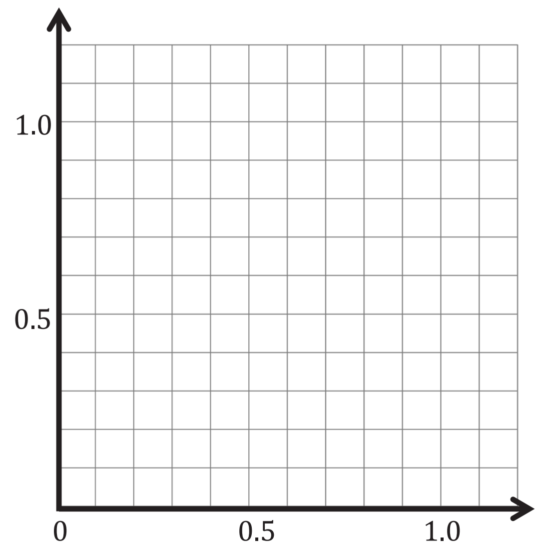


Name ____ Date ______________________

1. Plot and label the following points on the coordinate plane.

   C: (0.4, 0.4) A: (1.1, 0.4) S: (0.9, 0.5) T: (0.9, 1.1)

   a. Use a straightedge to construct line segments $\overline{CA}$ and $\overline{ST}$.

   b. Name the line segment that is perpendicular to the x-axis and parallel to the y-axis.

   ____

   c. Name the line segment that is parallel to the x-axis and perpendicular to the y-axis.

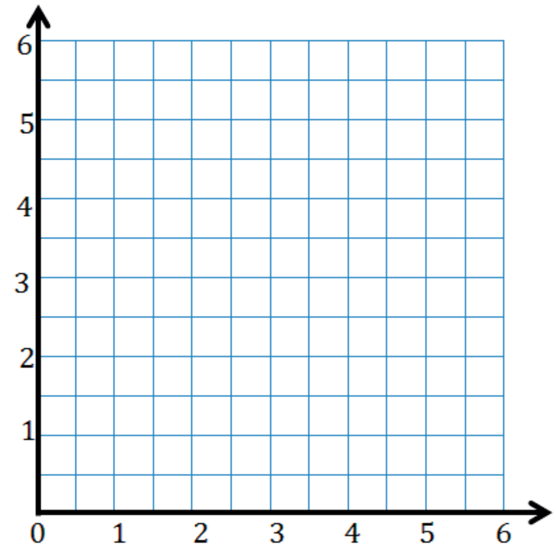
   ____

   d. Plot a point on $\overline{CA}$, and name it E. Plot a point on line segment $\overline{ST}$, and name it R.

   e. Write the coordinates of points E and R.

   E (_____ , _____) R (_____ , _____)

2. Construct line m such that the y-coordinate of every point is $1\frac{1}{2}$, and construct line n such that the x-coordinate of every point is $5\frac{1}{2}$.



a. Line m is ________ units from the x-axis.

b. Give the coordinates of the point on line m that is 2 units from the y-axis. ________

c. With a blue pencil, shade the portion of the grid that is less than $1\frac{1}{2}$ units from the x-axis.

d. Line n is _________ units from the y-axis.

e. Give the coordinates of the point on line n that is $3\frac{1}{2}$ units from the x-axis.

f. With a red pencil, shade the portion of the grid that is less than $5\frac{1}{2}$ units from the y-axis.

3. Construct and label lines e, r, s, and o on the plane below.

   a. Line e is 3.75 units above the x-axis.

   b. Line r is 2.5 units from the y-axis.

   c. Line s is parallel to line e but 0.75 farther from the x-axis.

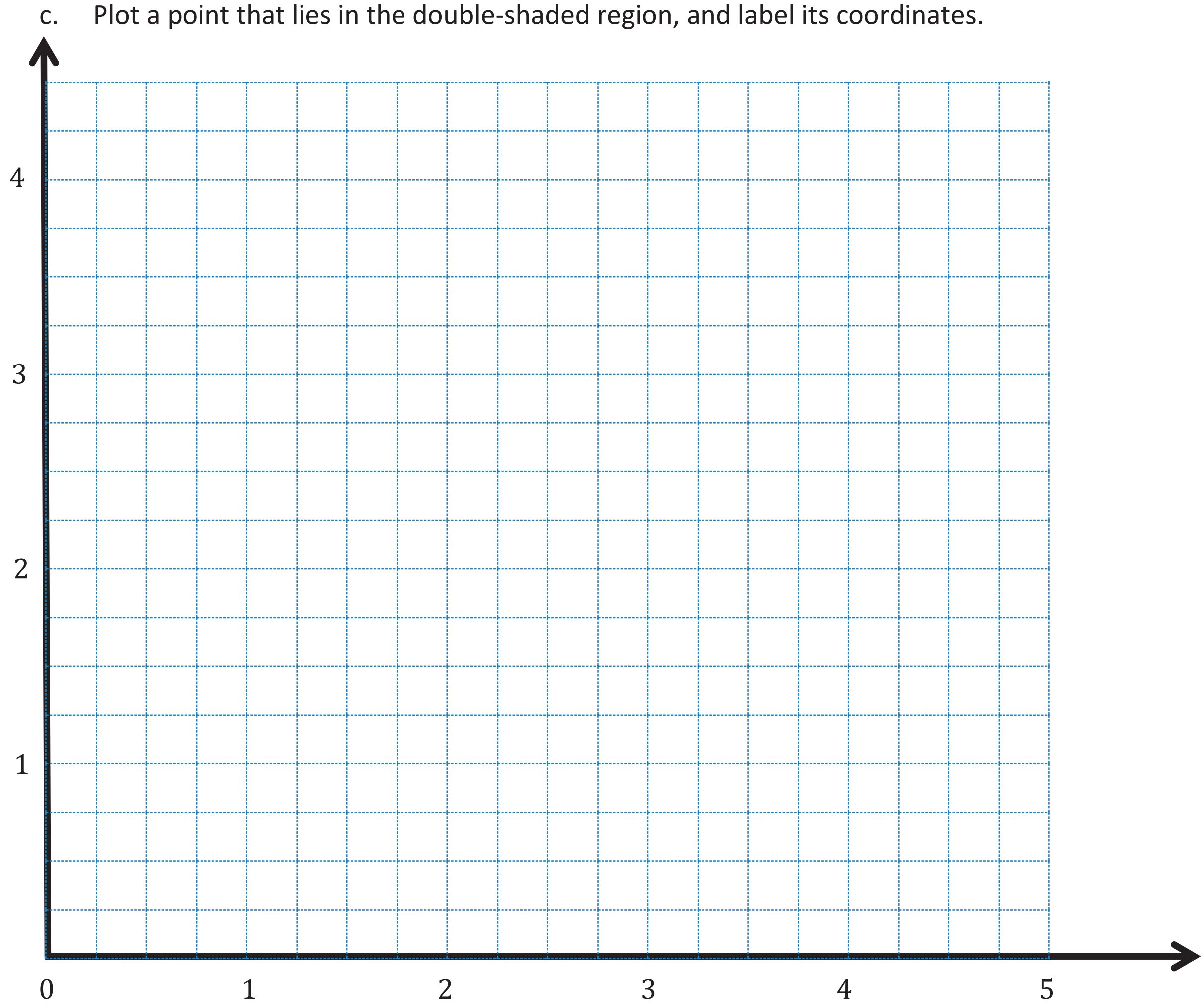
   d. Line o is perpendicular to lines s and e and passes through the point $(3\frac{1}{4}, 3\frac{1}{4})$.

4. Complete the following tasks on the plane.

   a. Using a blue pencil, shade the region that contains points that are more than $2\frac{1}{2}$ units and less than $3\frac{1}{4}$ units from the y-axis.

   b. Using a red pencil, shade the region that contains points that are more than $3\frac{3}{4}$ units and less than $4\frac{1}{2}$ units from the x-axis.

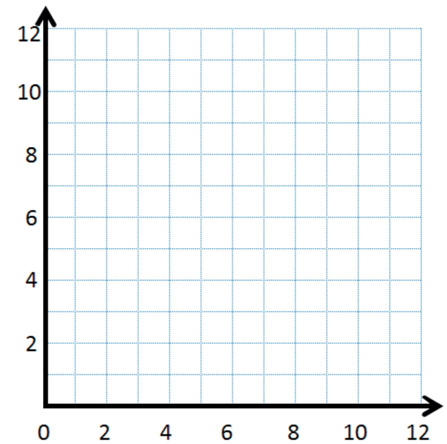
   c. Plot a point that lies in the double-shaded region, and label its coordinates.



Name ____ Date ______________________

1. Complete the chart. Then, plot the points on the coordinate plane below.

x	y	(x, y)
0	1	(0, 1)
2	3	
4	5	
6	7	



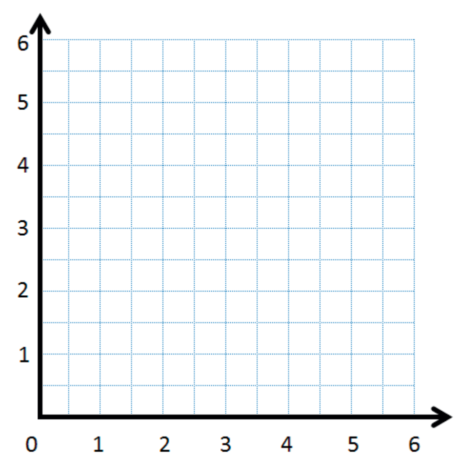
a. Use a straightedge to draw a line connecting these points.

b. Write a rule showing the relationship between the x- and y-coordinates of points on the line.

c. Name 2 other points that are on this line. ___________ _____________

2. Complete the chart. Then, plot the points on the coordinate plane below.

x	y	(x, y)
$\frac{1}{2}$	1	
1	2	
$1\frac{1}{2}$	3	
2	4	

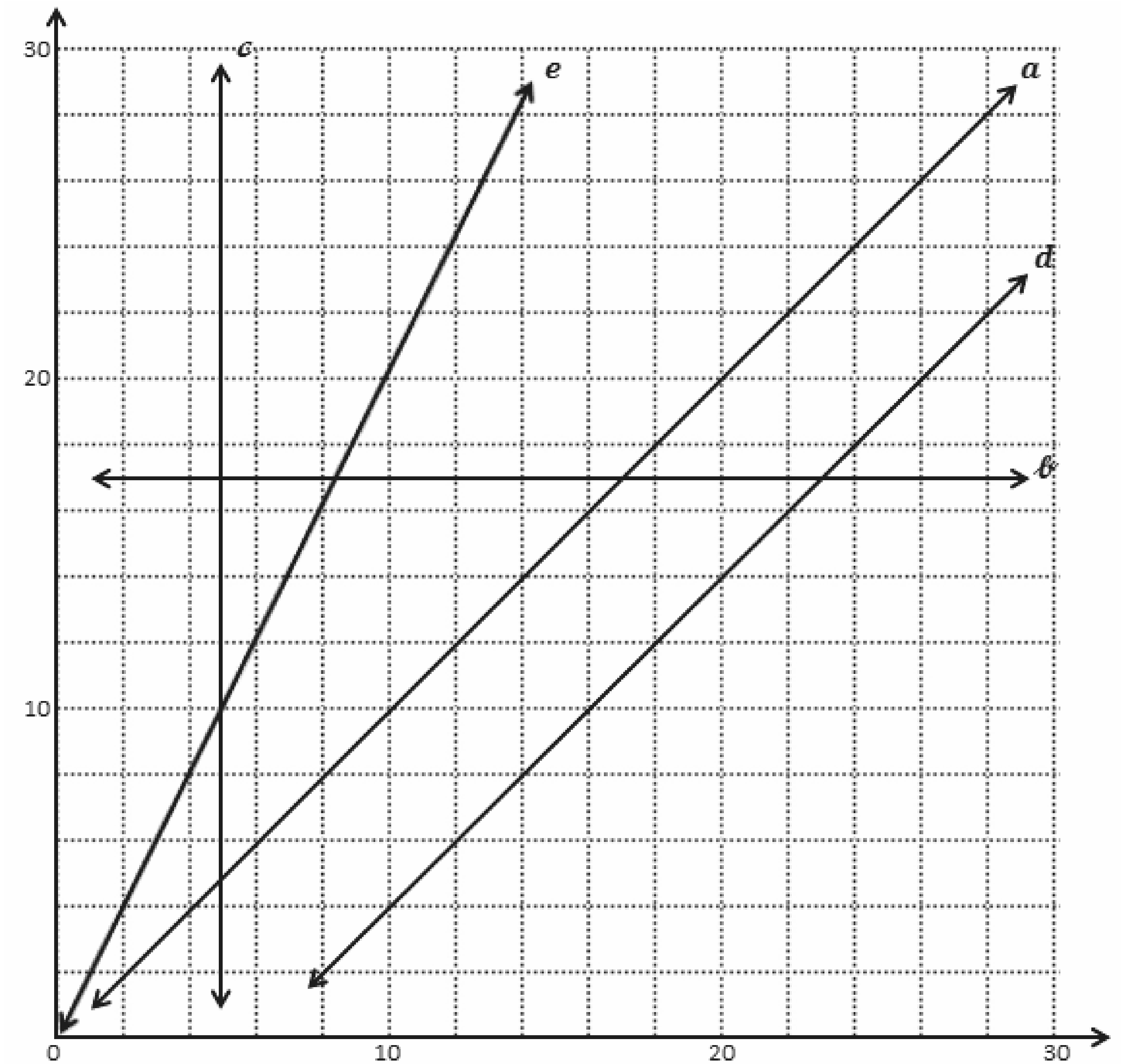


a. Use a straightedge to draw a line connecting these points.

b. Write a rule showing the relationship between the x- and y-coordinates.

c. Name 2 other points that are on this line. ___________ _____________

3. Use the coordinate plane below to answer the following questions.



a. Give the coordinates for 3 points that are on line a. ________ ________ ________

b. Write a rule that describes the relationship between the x- and y-coordinates for the points on line a.

c. What do you notice about the y-coordinates of every point on line ℓ?

d. Fill in the missing coordinates for points on line d.

(12, ______) (6, ______) (______, 24) (28, ______) (______, 28)

e. For any point on line c, the x-coordinate is ________.

f. Each of the points lies on at least 1 of the lines shown in the plane on the previous page. Identify a line that contains each of the following points.

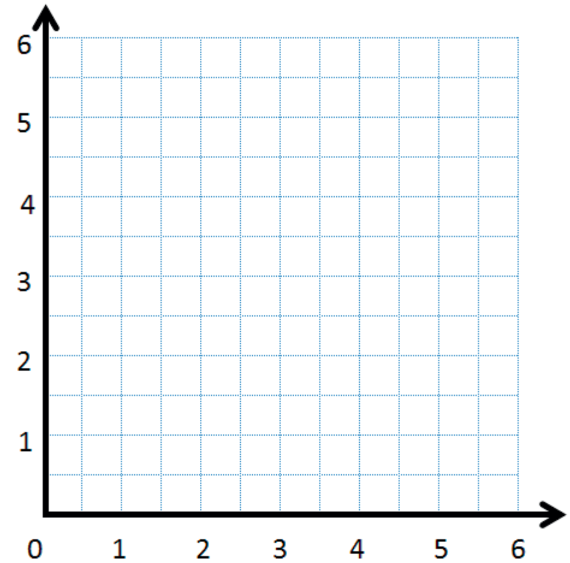
i. (7, 7) ___a___ ii. (14, 8) _______ iii. (5, 10) _______

iv. (0, 17) _______ v. (15.3, 9.3) _______ vi. (20, 40) _______

Name ______________________________________ Date ____________________

1. Complete the chart. Then, plot the points on the coordinate plane.

x	y	(x, y)
2	0	
$3\frac{1}{2}$	$1\frac{1}{2}$	
$4\frac{1}{2}$	$2\frac{1}{2}$	
6	4	



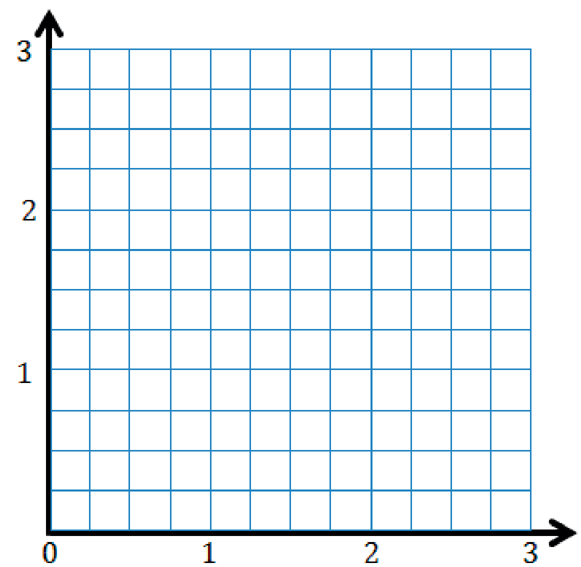
a. Use a straightedge to draw a line connecting these points.

b. Write a rule showing the relationship between the x- and y-coordinates of points on this line.

c. Name two other points that are also on this line. ____________ ____________

2. Complete the chart. Then, plot the points on the coordinate plane.

x	y	(x, y)
0	0	
$\frac{1}{4}$	$\frac{3}{4}$	
$\frac{1}{2}$	$1\frac{1}{2}$	
1	3	

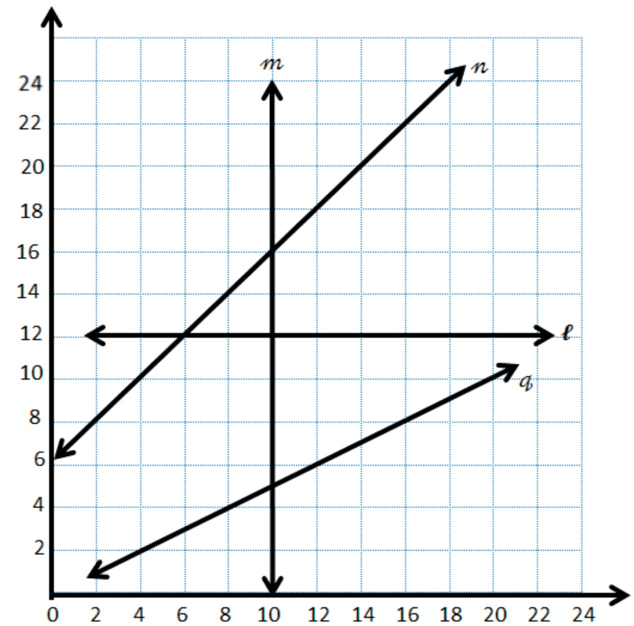


a. Use a straightedge to draw a line connecting these points.

b. Write a rule showing the relationship between the x- and y-coordinates for points on the line.

c. Name two other points that are also on this line. ____________ ____________

3. Use the coordinate plane to answer the following questions.



a. For any point on line $\boldsymbol{m}$, the x-coordinate is ________.

b. Give the coordinates for 3 points that are on line $\boldsymbol{n}$.

c. Write a rule that describes the relationship between the x- and y-coordinates on line $\boldsymbol{n}$.

d. Give the coordinates for 3 points that are on line $\boldsymbol{q}$.

e. Write a rule that describes the relationship between the x- and y-coordinates on line $\boldsymbol{q}$.

f. Identify a line on which each of these points lie.

i. (10, 3.2) _______

ii. (12.4, 18.4) _______

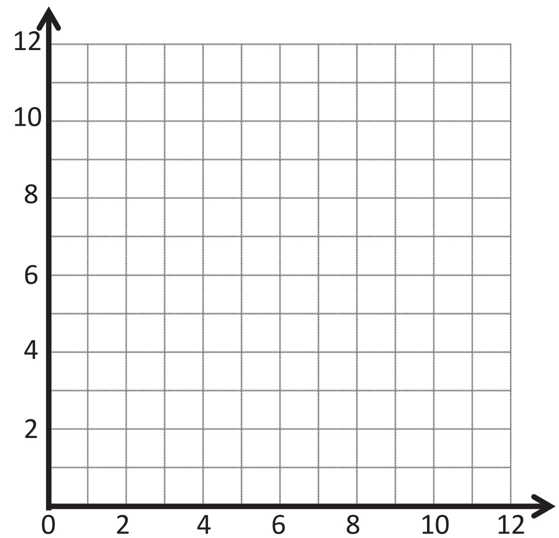
iii. (6.45, 12) _______

iv. (14, 7) _______

Name ______________________________ Date ________________

1. Create a table of 3 values for x and y such that each y-coordinate is 3 more than the corresponding x-coordinate.

x	y	(x, y)



a. Plot each point on the coordinate plane.

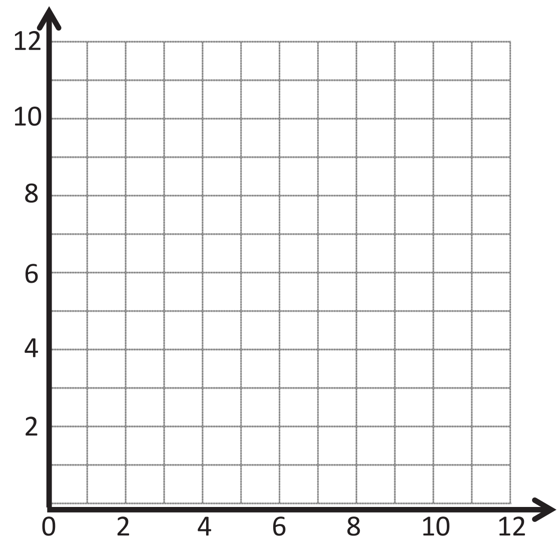
b. Use a straightedge to draw a line connecting these points.

c. Give the coordinates of 2 other points that fall on this line with x-coordinates greater than 12.

(______ , ______) and (______ , ______)

2. Create a table of 3 values for x and y such that each y-coordinate is 3 times as much as its corresponding x-coordinate.

x	y	(x, y)



a. Plot each point on the coordinate plane.

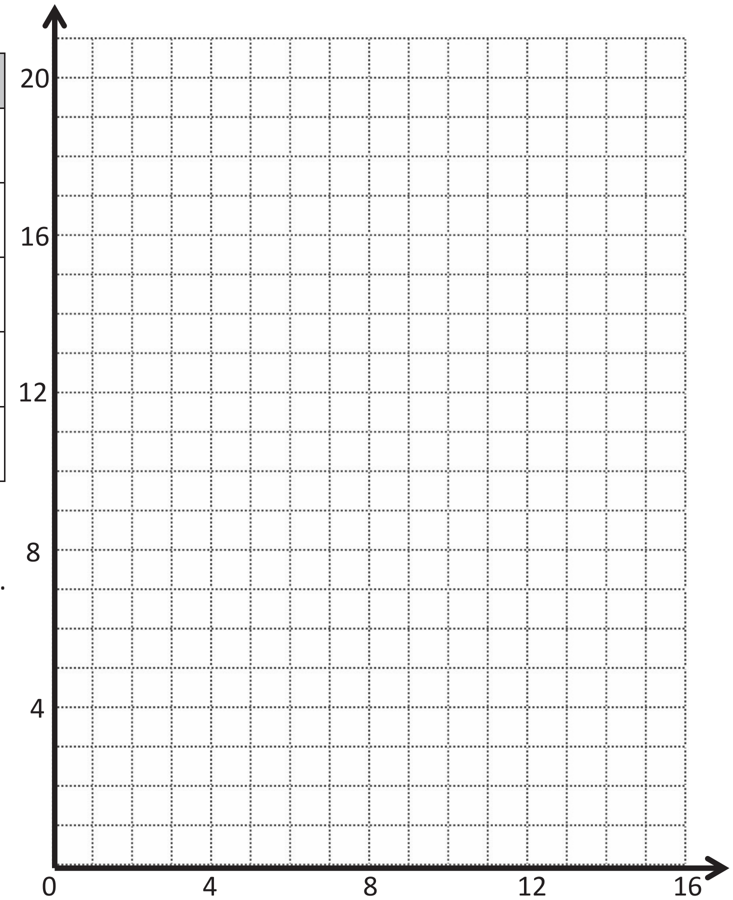
b. Use a straightedge to draw a line connecting these points.

c. Give the coordinates of 2 other points that fall on this line with y-coordinates greater than 25.

(______ , ______) and (______ , ______)

3. Create a table of 5 values for x and y such that each y-coordinate is 1 more than 3 times as much as its corresponding x value.

x	y	(x, y)



a. Plot each point on the coordinate plane.

b. Use a straightedge to draw a line connecting these points.

c. Give the coordinates of 2 other points that would fall on this line whose x-coordinates are greater than 12.
(_______ , _______) and (_______, _______)

4. Use the coordinate plane below to complete the following tasks.

a. Graph the lines on the plane.

line ℓ: x is equal to y

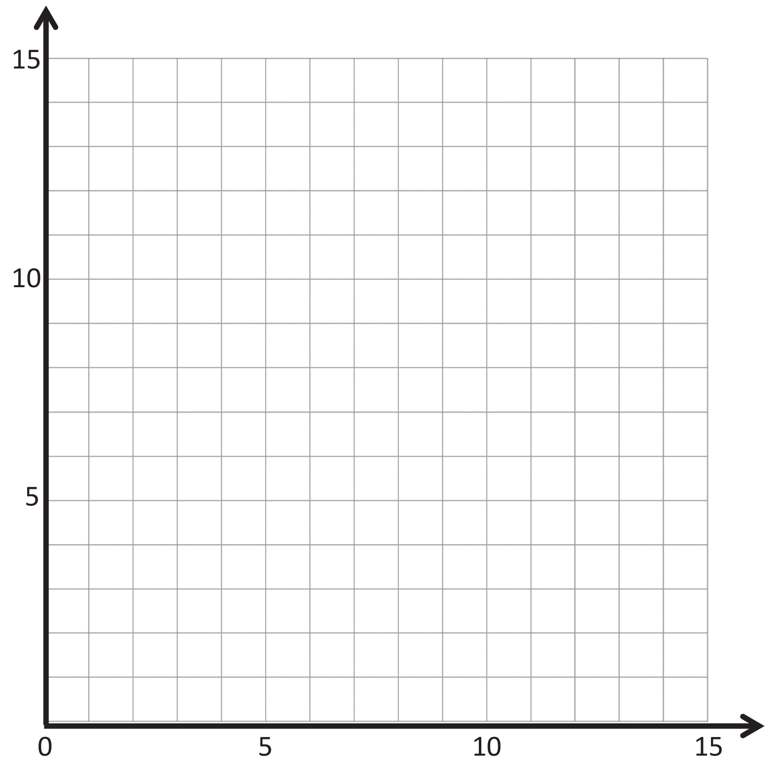
	x	y	(x, y)
A			
B			
C			

line m: y is 1 more than x

	x	y	(x, y)
G			
H			
I			

line n: y is 1 more than twice x

	x	y	(x, y)
S			
T			
U			



b. Which two lines intersect? Give the coordinates of their intersection.

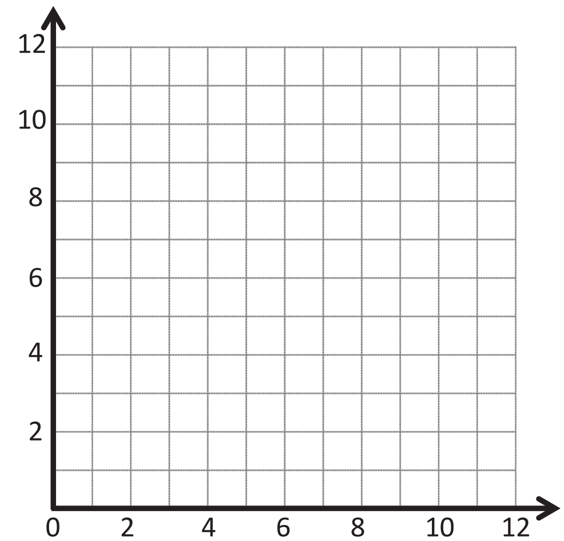
c. Which two lines are parallel?

d. Give the rule for another line that would be parallel to the lines you listed in Problem 4(c).

Name ____ Date ______________________

1. Complete this table such that each y-coordinate is 4 more than the corresponding x-coordinate.

x	y	(x, y)



a. Plot each point on the coordinate plane.

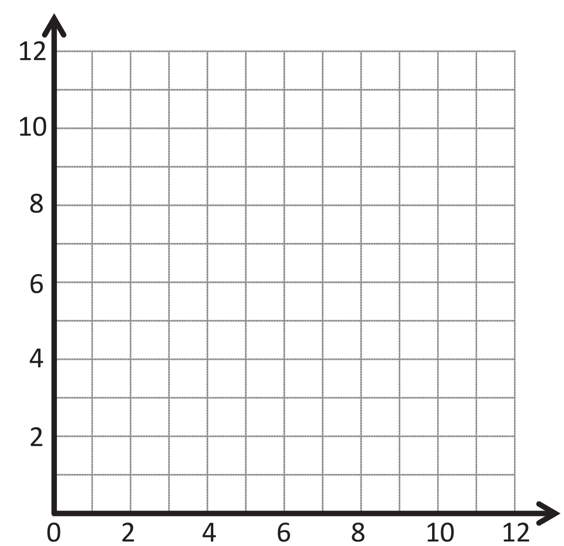
b. Use a straightedge to construct a line connecting these points.

c. Give the coordinates of 2 other points that fall on this line with x-coordinates greater than 18.

(______ , ______) and (______ , ______)

2. Complete this table such that each y-coordinate is 2 times as much as its corresponding x-coordinate.

x	y	(x, y)



a. Plot each point on the coordinate plane.

b. Use a straightedge to draw a line connecting these points.

c. Give the coordinates of 2 other points that fall on this line with y-coordinates greater than 25.

(______ , ______) and (______ , ______)

3. Use the coordinate plane below to complete the following tasks.

a. Graph these lines on the plane.

line ℓ: x is equal to y

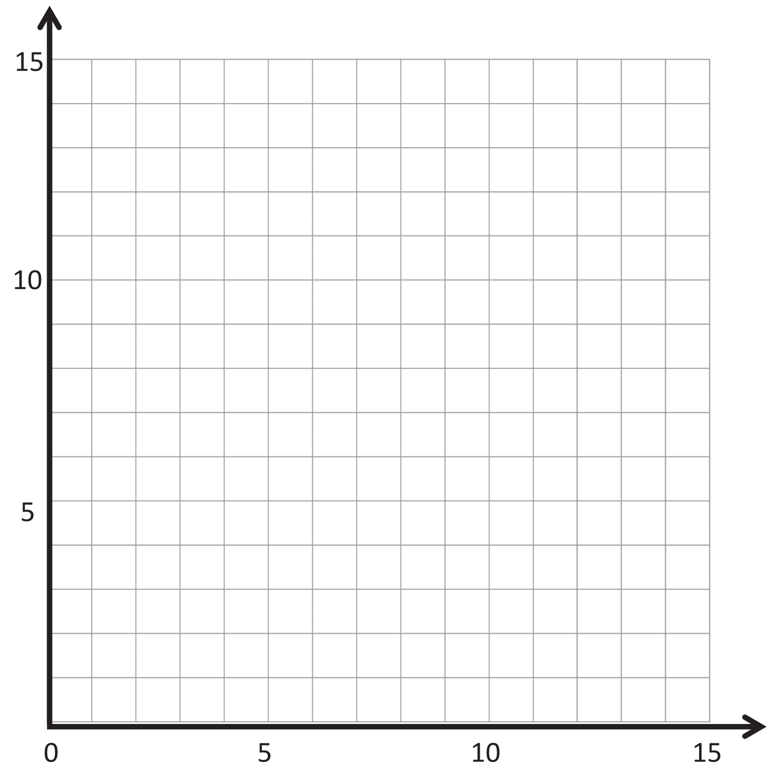
	x	y	(x, y)
A			
B			
C			

line m: y is 1 less than x

	x	y	(x, y)
G			
H			
I			

line n: y is 1 less than twice x

	x	y	(x, y)
S			
T			
U			



b. Do any of these lines intersect? If yes, identify which ones, and give the coordinates of their intersection.

c. Are any of these lines parallel? If yes, identify which ones.

d. Give the rule for another line that would be parallel to the lines you listed in Problem 3(c).

Name ______________________________ Date ________________

1. Complete the table for the given rules.

Line a

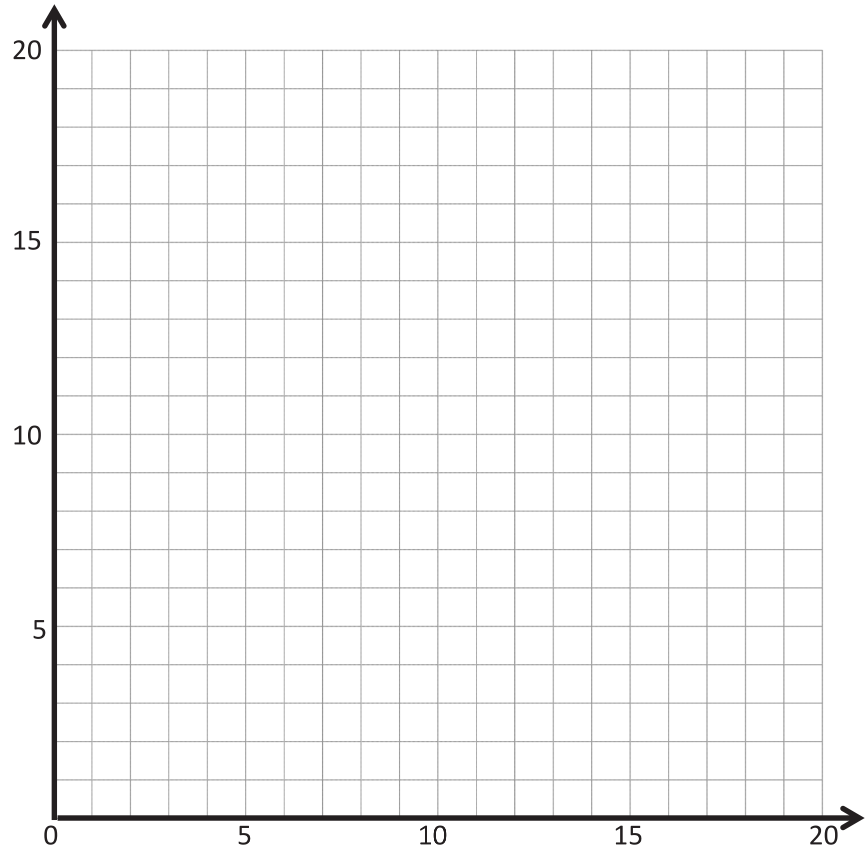
Rule: y is 1 more than x

x	y	(x, y)
1		
5		
9		
13		

Line b

Rule: y is 4 more than x

x	y	(x, y)
0		
5		
8		
11		



a. Construct each line on the coordinate plane above.

b. Compare and contrast these lines.

c. Based on the patterns you see, predict what line c, whose rule is *y is 7 more than x*, would look like. Draw your prediction on the plane above.

2. Complete the table for the given rules.

Line e

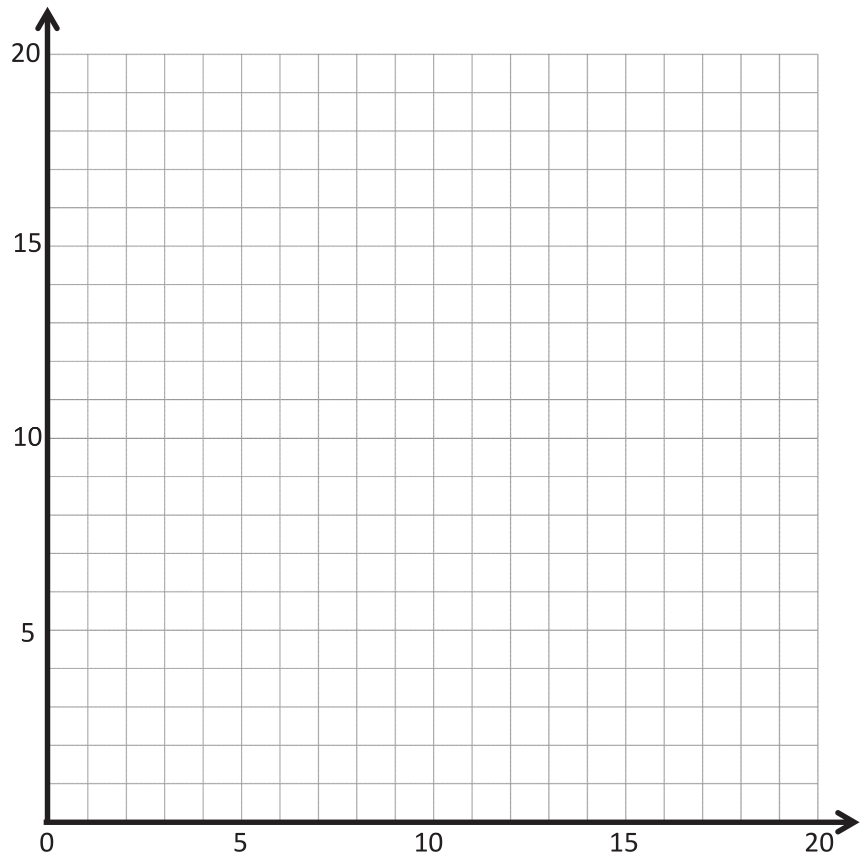
Rule: y is twice as much as x

x	y	(x, y)
0		
2		
5		
9		

Line f

Rule: y is half as much as x

x	y	(x, y)
0		
6		
10		
20		



a. Construct each line on the coordinate plane above.

b. Compare and contrast these lines.

c. Based on the patterns you see, predict what line g, whose rule is *y is 4 times as much as x*, would look like. Draw your prediction in the plane above.

Name ______________________________ Date ________________

1. Complete the table for the given rules.

Line a

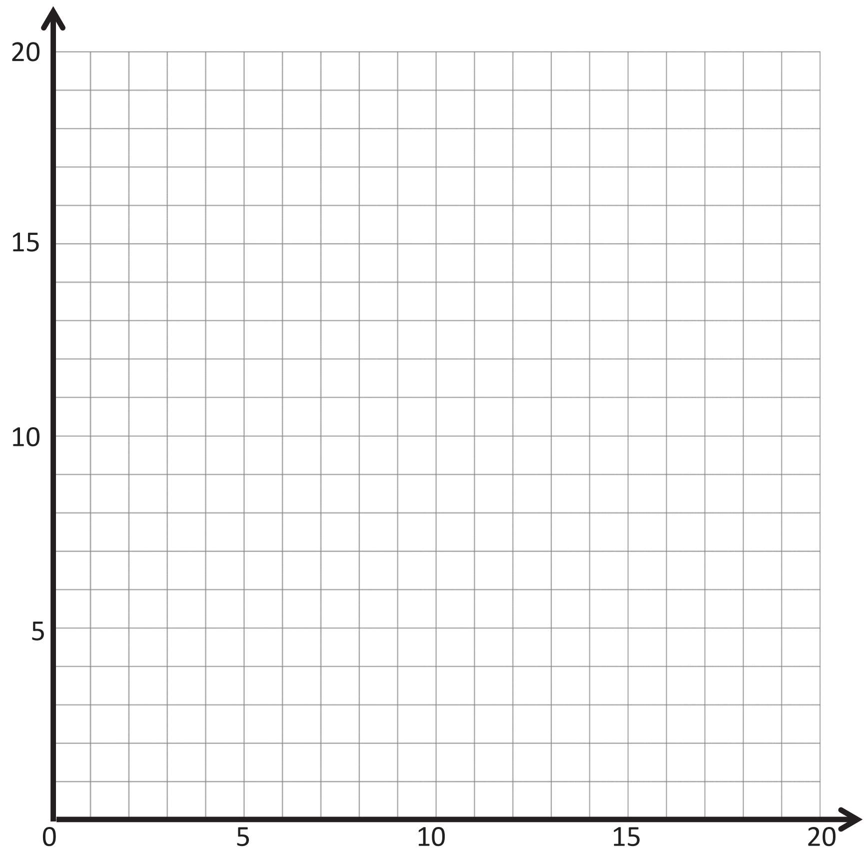
Rule: y is 1 less than x

x	y	(x, y)
1		
4		
9		
16		

Line b

Rule: y is 5 less than x

x	y	(x, y)
5		
8		
14		
20		



a. Construct each line on the coordinate plane.

b. Compare and contrast these lines.

c. Based on the patterns you see, predict what line c, whose rule is y is 7 less than x, would look like. Draw your prediction on the plane above.

2. Complete the table for the given rules.

Line e

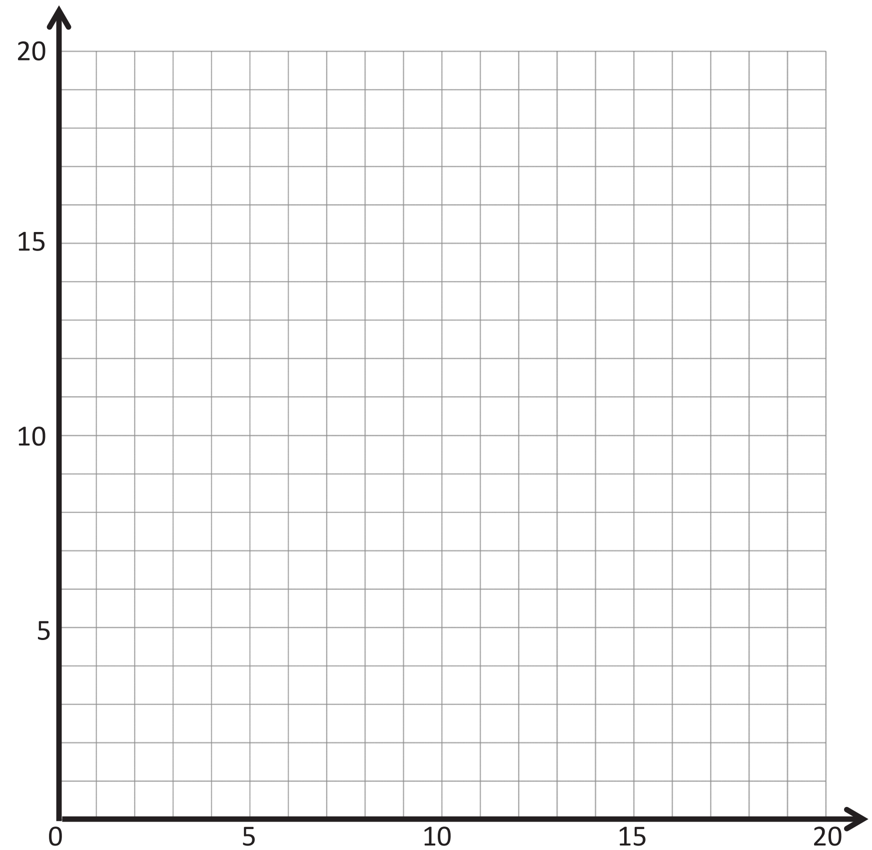
Rule: y is 3 times as much as x

x	y	(x, y)
0		
1		
4		
6		

Line f

Rule: y is a third as much as x

x	y	(x, y)
0		
3		
9		
15		



a. Construct each line on the coordinate plane.

b. Compare and contrast these lines.

c. Based on the patterns you see, predict what line g, whose rule is *y is 4 times as much as x*, and line h, whose rule is *y is one-fourth as much as x*, would look like. Draw your prediction in the plane above.

Name ______________________________ Date ________________

1. Use the coordinate plane below to complete the following tasks.

   a. Line p represents the rule x *and* y *are equal*.

   b. Construct a line, d, that is parallel to line p and contains point D.

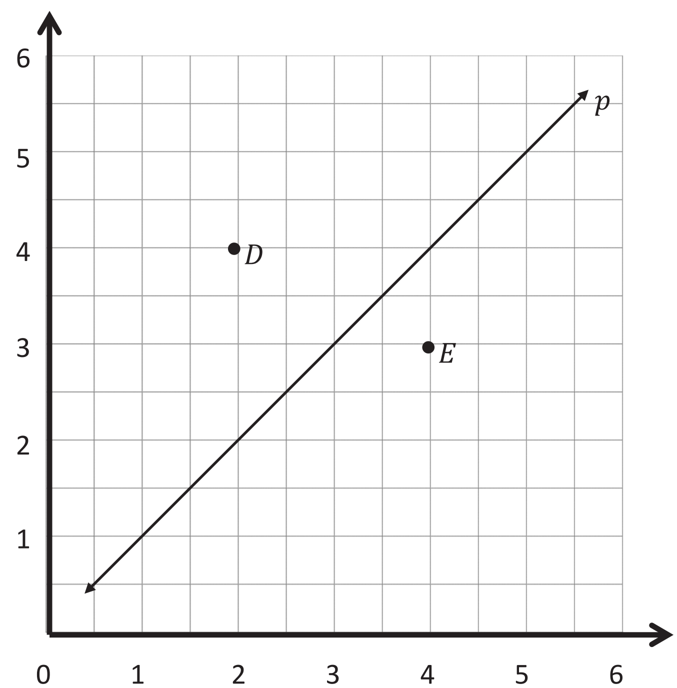
   c. Name 3 coordinate pairs on line d.

   d. Identify a rule to describe line d.

   e. Construct a line, e, that is parallel to line p and contains point E.

   f. Name 3 points on line e.

   g. Identify a rule to describe line e.



   h. Compare and contrast lines d and e in terms of their relationship to line p.

2. Write a rule for a fourth line that would be parallel to those above and would contain the point $(3\frac{1}{2}, 6)$. Explain how you know.

3. Use the coordinate plane below to complete the following tasks.

   a. Line p represents the rule x *and* y *are equal*.

   b. Construct a line, v, that contains the origin and point V.

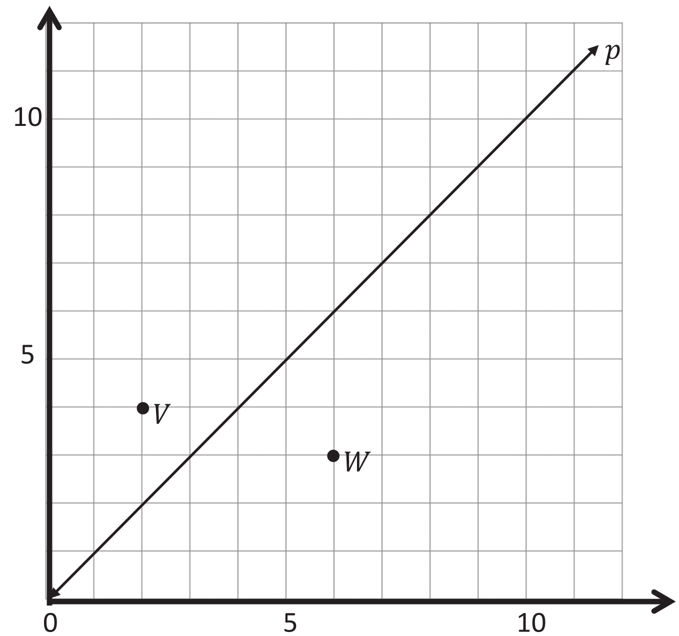
   c. Name 3 points on line v.

   d. Identify a rule to describe line v.

   e. Construct a line, w, that contains the origin and point W.

   f. Name 3 points on line w.

   g. Identify a rule to describe line w.



   h. Compare and contrast lines v and w in terms of their relationship to line p.

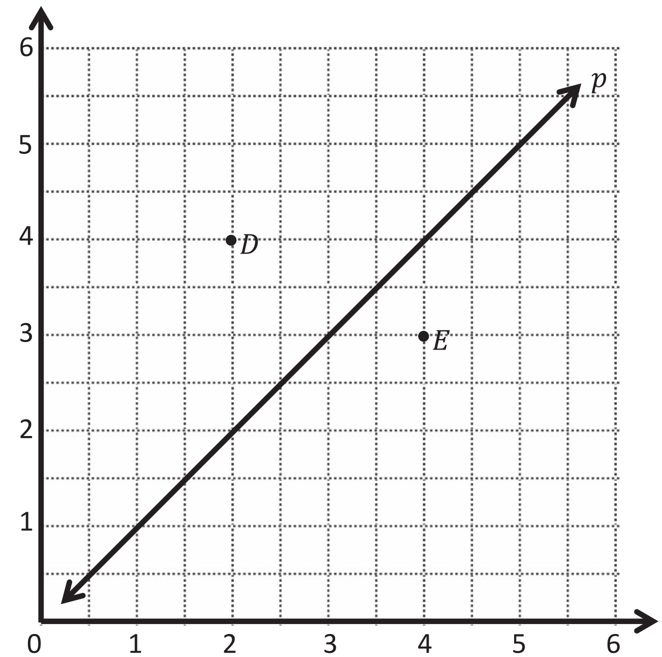
   i. What patterns do you see in lines that are generated by multiplication rules?

4. Circle the rules that generate lines that are parallel to each other.

   add 5 to x *multiply* x *by* $\frac{2}{3}$ x *plus* $\frac{1}{2}$ x *times* $1\frac{1}{2}$

Name ____ Date ______________________

1. Use the coordinate plane to complete the following tasks.



   a. Line p represents the rule *x and y are equal*.

   b. Construct a line, d, that is parallel to line p and contains point D.

   c. Name 3 coordinate pairs on line d.

   d. Identify a rule to describe line d.

   e. Construct a line, e, that is parallel to line p and contains point E.

   f. Name 3 points on line e.

   g. Identify a rule to describe line e.

   h. Compare and contrast lines d and e in terms of their relationship to line p.

2. Write a rule for a fourth line that would be parallel to those above and that would contain the point $(5\frac{1}{2}, 2)$. Explain how you know.

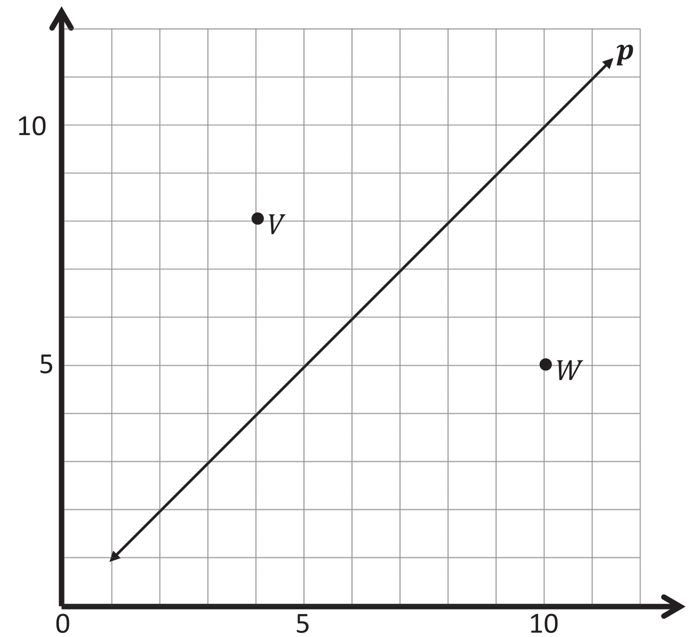
3. Use the coordinate plane below to complete the following tasks.

   a. Line p represents the rule x *and* y *are equal*.

   b. Construct a line, v, that contains the origin and point V.

   c. Name 3 points on line v.

   d. Identify a rule to describe line v.



   e. Construct a line, w, that contains the origin and point W.

   f. Name 3 points on line w.

   g. Identify a rule to describe line w.

   h. Compare and contrast lines v and w in terms of their relationship to line p.

   i. What patterns do you see in lines that are generated by multiplication rules?

Name ____ Date ______________________

1. Complete the tables for the given rules.

Line ℓ

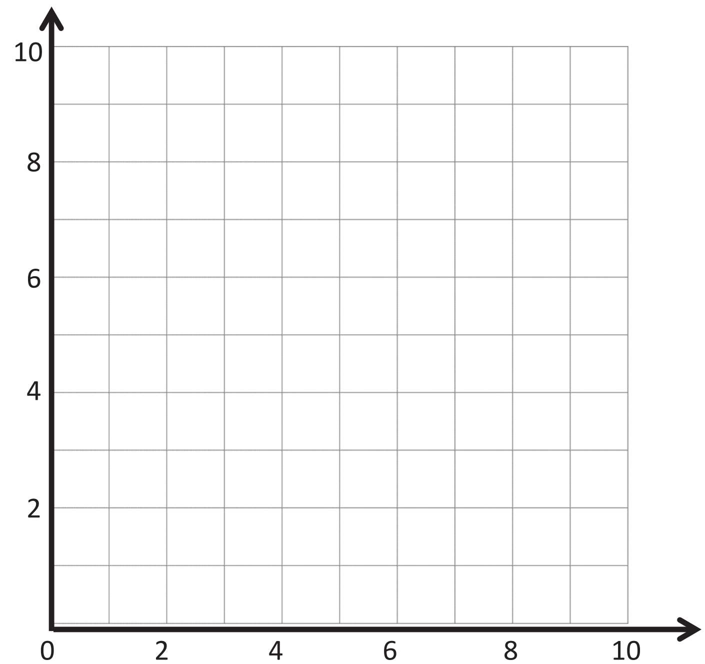
Rule: *Double* x

x	y	(x, y)
0		
1		
2		
3		

Line m

Rule: *Double* x*, and then add 1*

x	y	(x, y)
0		
1		
2		
3		



a. Draw each line on the coordinate plane above.

b. Compare and contrast these lines.

c. Based on the patterns you see, predict what the line for the rule *double* x*, and then subtract 1* would look like. Draw the line on the plane above.

2. Circle the point(s) that the line for the rule *multiply* x *by* $\frac{1}{3}$*, and then add 1* would contain.

$(0, \frac{1}{3})$ $(2, 1\frac{2}{3})$ $(1\frac{1}{2}, 1\frac{1}{2})$ $(2\frac{1}{4}, 2\frac{1}{4})$

a. Explain how you know.

b. Give two other points that fall on this line.

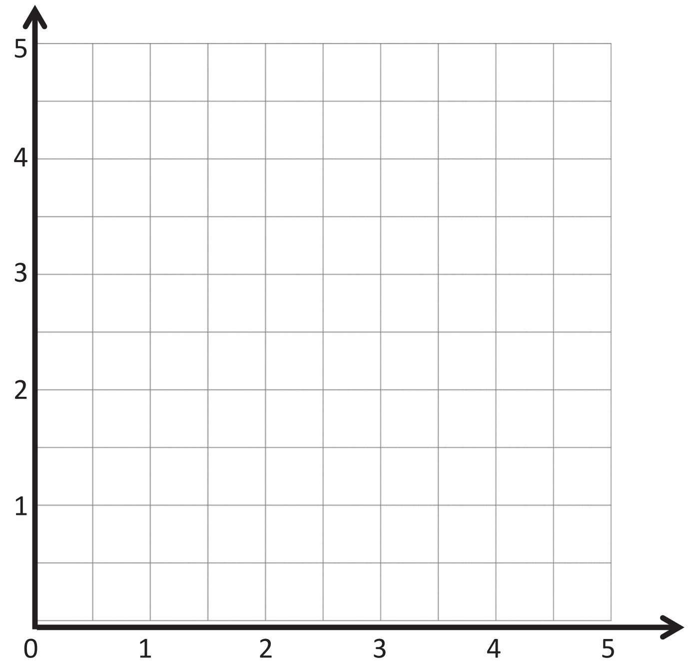
3. Complete the tables for the given rules.

Line ℓ
Rule: *Halve x*

x	y	(x, y)
0		
1		
2		
3		

Line m
Rule: *Halve x, and then add $1\frac{1}{2}$*

x	y	(x, y)
0		
1		
2		
3		



a. Draw each line on the coordinate plane above.

b. Compare and contrast these lines.

c. Based on the patterns you see, predict what the line for the rule *halve x, and then subtract 1* would look like. Draw the line on the plane above.

4. Circle the point(s) that the line for the rule *multiply x by $\frac{2}{3}$, and then subtract 1* would contain.

$(1\frac{1}{3}, \frac{1}{9})$ $(2, \frac{1}{3})$ $(1\frac{3}{2}, 1\frac{1}{2})$ $(3, 1)$

a. Explain how you know.

b. Give two other points that fall on this line.

Name ____________________________ Date ________________

1. Complete the tables for the given rules.

Line ℓ

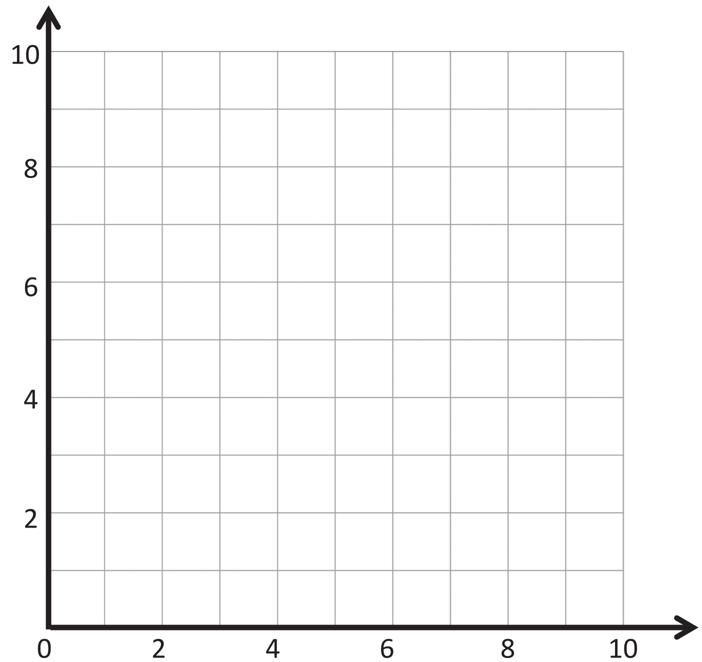
Rule: *Double x*

x	y	(x, y)
1		
2		
3		

Line m

Rule: *Double x, and then subtract 1*

x	y	(x, y)
1		
2		
3		



a. Draw each line on the coordinate plane above.

b. Compare and contrast these lines.

c. Based on the patterns you see, predict what the line for the rule *double x, and then add 1* would look like. Draw your prediction on the plane above.

2. Circle the point(s) that the line for the rule *multiply x by $\frac{1}{2}$, and then add 1* would contain.

$(0, \frac{1}{2})$ $(2, 1\frac{1}{4})$ $(2, 2)$ $(3, \frac{1}{2})$

a. Explain how you know.

b. Give two other points that fall on this line.

3. Complete the tables for the given rules.

Line ℓ

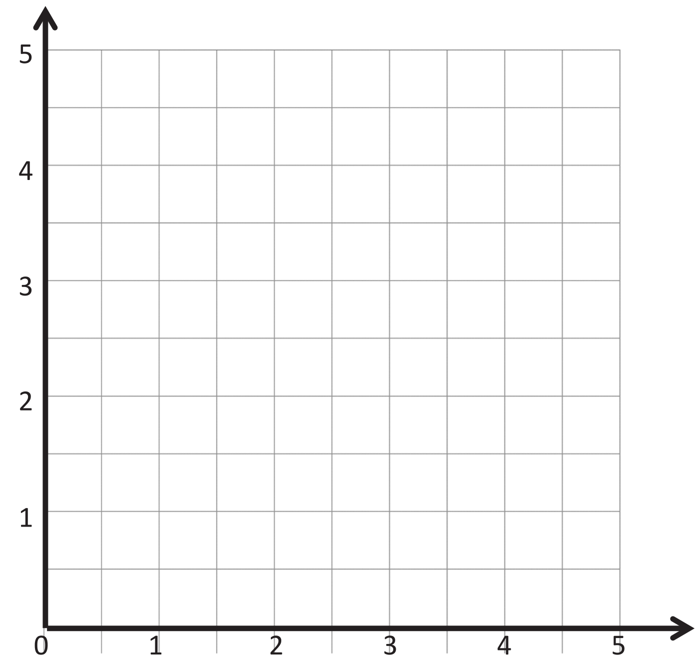
Rule: *Halve x, and then add 1*

x	y	(x, y)
0		
1		
2		
3		

Line m

Rule: *Halve x, and then add $1\frac{1}{4}$*

x	y	(x, y)
0		
1		
2		
3		



a. Draw each line on the coordinate plane above.

b. Compare and contrast these lines.

c. Based on the patterns you see, predict what the line for the rule *halve x, and then subtract 1* would look like. Draw your prediction on the plane above.

4. Circle the point(s) that the line for the rule *multiply x by $\frac{3}{4}$, and then subtract $\frac{1}{2}$* would contain.

$(1, \frac{1}{4})$ $(2, \frac{1}{4})$ $(3, 1\frac{3}{4})$ $(3, 1)$

a. Explain how you know.

b. Give two other points that fall on this line.

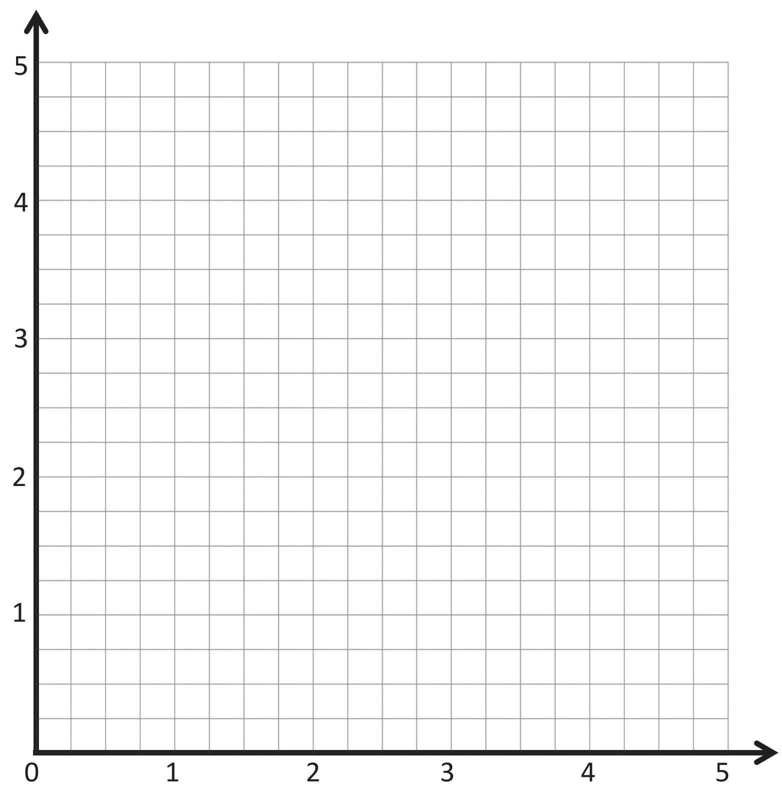
Name ____ Date ______________________

1. Write a rule for the line that contains the points $(0, \frac{3}{4})$ and $(2\frac{1}{2}, 3\frac{1}{4})$.

   a. Identify 2 more points on this line. Draw the line on the grid below.

Point	x	y	(x, y)
B			
C			

   b. Write a rule for a line that is parallel to $\overleftrightarrow{BC}$ and goes through point $(1, \frac{1}{4})$.



2. Create a rule for the line that contains the points $(1, \frac{1}{4})$ and $(3, \frac{3}{4})$.

   a. Identify 2 more points on this line. Draw the line on the grid on the right.

Point	x	y	(x, y)
G			
H			

   b. Write a rule for a line that passes through the origin and lies between $\overleftrightarrow{BC}$ and $\overleftrightarrow{GH}$.

3. Create a rule for a line that contains the point $(\frac{1}{4}, 1\frac{1}{4})$ using the operation or description below. Then, name 2 other points that would fall on each line.

a. Addition: ____________

Point	x	y	(x, y)
T			
U			

b. A line parallel to the x-axis: ______________

Point	x	y	(x, y)
G			
H			

c. Multiplication: ______________

Point	x	y	(x, y)
A			
B			

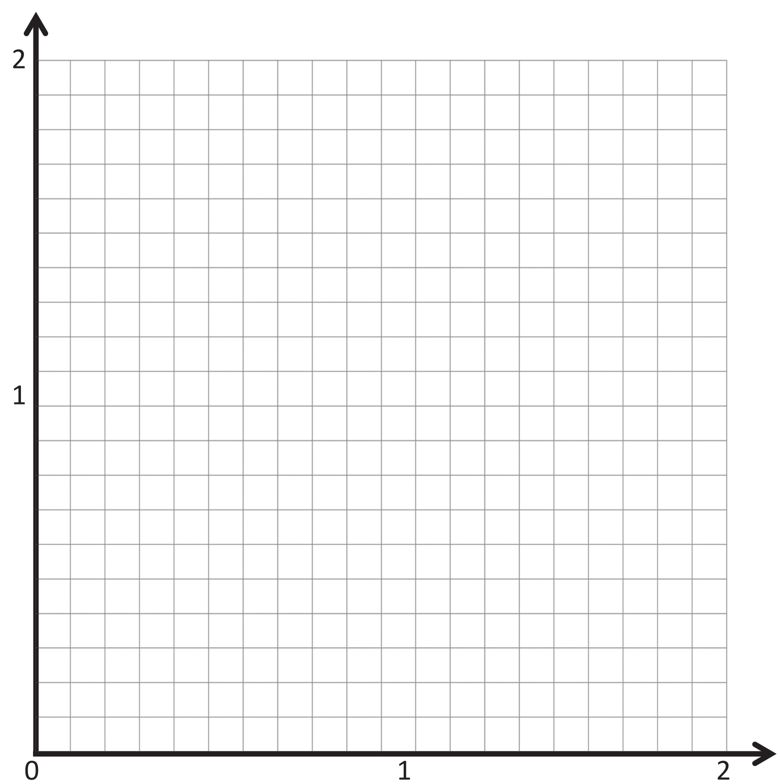
d. A line parallel to the y-axis: ______________

Point	x	y	(x, y)
V			
W			

e. Multiplication with addition: _________

Point	x	y	(x, y)
R			
S			

4. Mrs. Boyd asked her students to give a rule that could describe a line that contains the point (0.6, 1.8). Avi said the rule could be *multiply x by 3*. Ezra claims this could be a vertical line, and the rule could be *x is always 0.6.* Erik thinks the rule could be *add 1.2 to x*. Mrs. Boyd says that all the lines they are describing could describe a line that contains the point she gave. Explain how that is possible, and draw the lines on the coordinate plane to support your response.



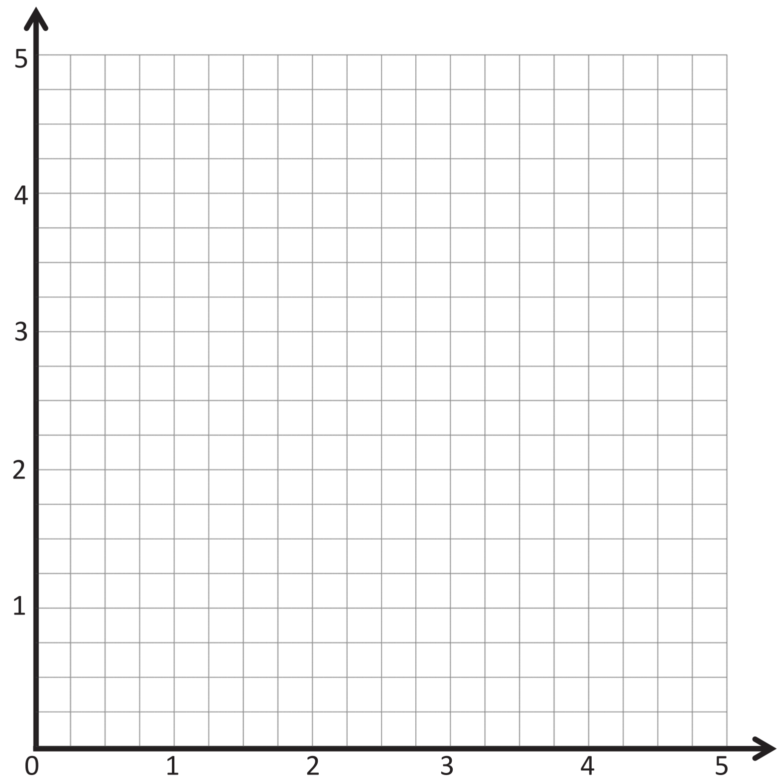
Extension:

5. Create a mixed operation rule for the line that contains the points (0, 1) and (1, 3).

   a. Identify 2 more points, O and P, on this line. Draw the line on the grid.

Point	x	y	(x, y)
O			
P			

   b. Write a rule for a line that is parallel to $\overleftrightarrow{OP}$ and goes through point (1, $2\frac{1}{2}$).



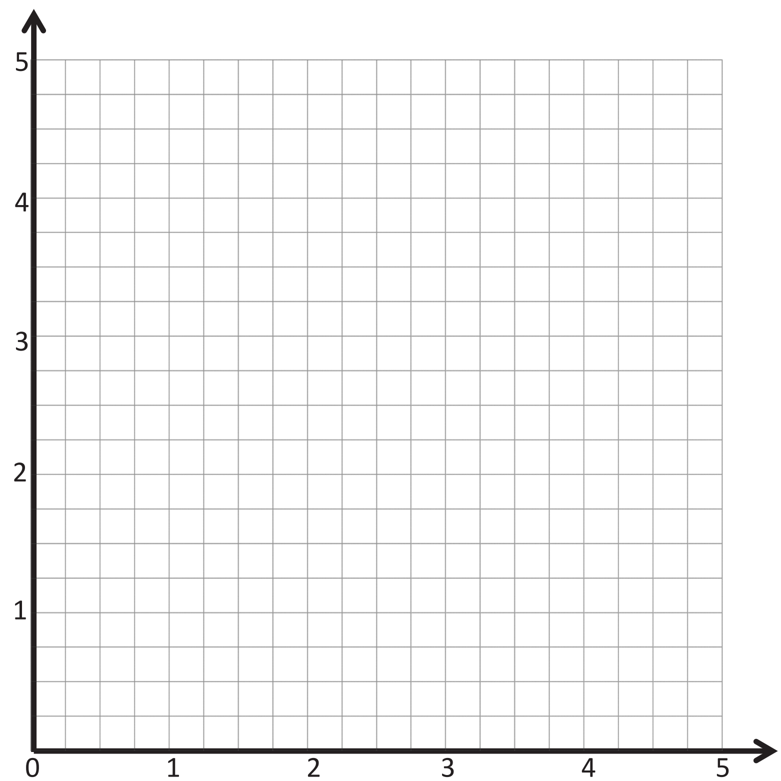
Name ______________________________ Date ______________

1. Write a rule for the line that contains the points $(0, \frac{1}{4})$ and $(2\frac{1}{2}, 2\frac{3}{4})$.

   a. Identify 2 more points on this line. Draw the line on the grid below.

Point	x	y	(x, y)
B			
C			

   b. Write a rule for a line that is parallel to $\overleftrightarrow{BC}$ and goes through point $(1, 2\frac{1}{4})$.



2. Give the rule for the line that contains the points $(1, 2\frac{1}{2})$ and $(2\frac{1}{2}, 2\frac{1}{2})$.

   a. Identify 2 more points on this line. Draw the line on the grid above.

Point	x	y	(x, y)
G			
H			

   b. Write a rule for a line that is parallel to $\overleftrightarrow{GH}$.

3. Give the rule for a line that contains the point $(\frac{3}{4}, 1\frac{1}{2})$ using the operation or description below. Then, name 2 other points that would fall on each line.

a. Addition: ________________

Point	x	y	(x, y)
T			
U			

b. A line parallel to the x-axis: ________________

Point	x	y	(x, y)
G			
H			

c. Multiplication: ________________

Point	x	y	(x, y)
A			
B			

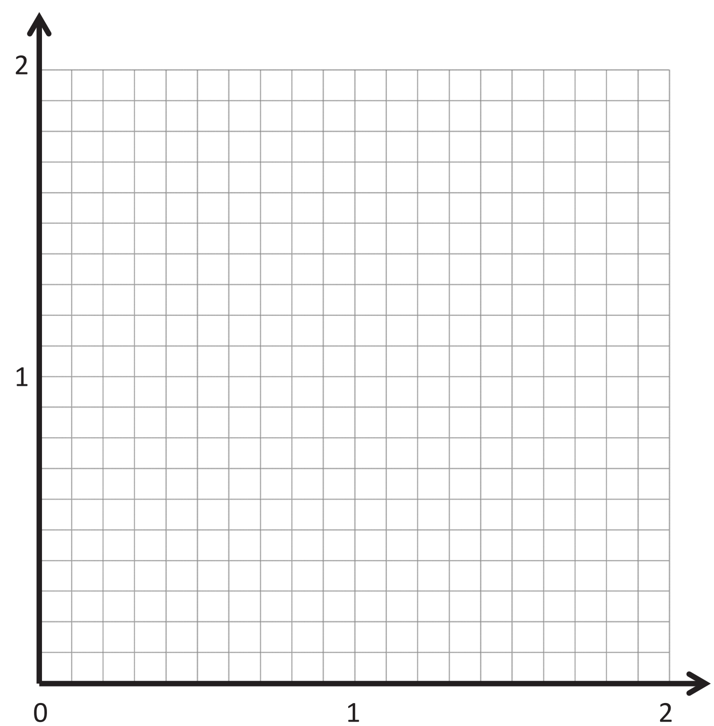
d. A line parallel to the y-axis: ________________

Point	x	y	(x, y)
V			
W			

e. Multiplication with addition: _____________

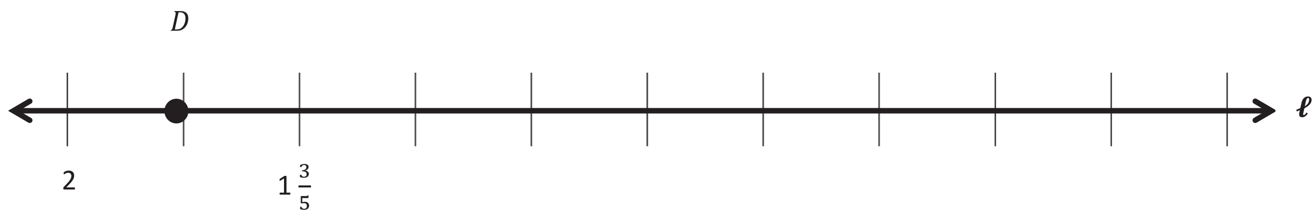
Point	x	y	(x, y)
R			
S			

4. On the grid, two lines intersect at (1.2, 1.2). If line a passes through the origin and line b contains the point (1.2, 0), write a rule for line a and line b.



Name ______________________________ Date ________________

Use number line $\boldsymbol{\ell}$ to answer the questions.



a. Plot point C so that its distance from the origin is 1.

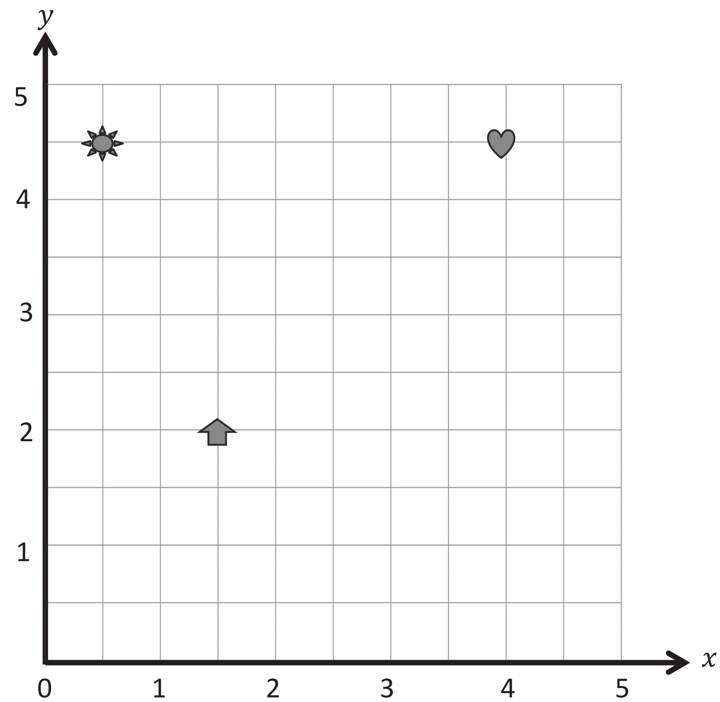
b. Plot point E $\frac{4}{5}$ closer to the origin than C. What is its coordinate? ____________

c. Plot a point at the midpoint of C and E. Label it H.

Name ____ Date ____________________

1. Name the coordinates of the shapes below.

Shape	x-coordinate	y-coordinate
Sun		
Arrow		
Heart		

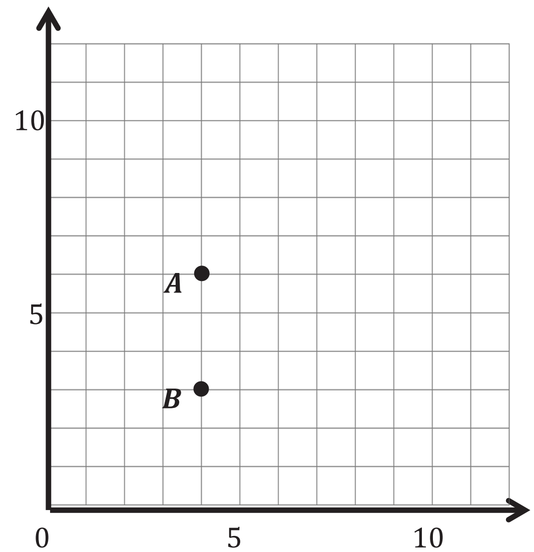


2. Plot a square at $(3, 3\frac{1}{2})$.

3. Plot a triangle at $(4\frac{1}{2}, 1)$.

Name ______________________________ Date ________________

1. Use a straightedge to construct a line that goes through points A and B. Label the line ℓ.



2. Which axis is parallel to line ℓ?

   Which axis is perpendicular to line ℓ?

3. Plot two more points on line ℓ. Name them C and D.

4. Give the coordinates of each point below.

   A: __________ B: __________

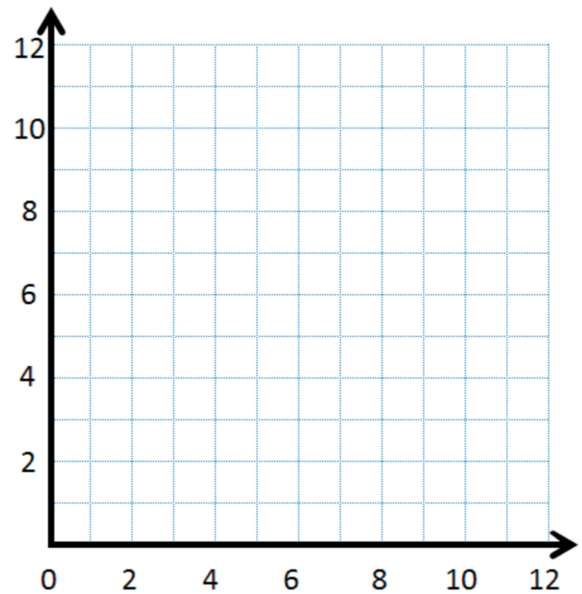
   C: __________ D: __________

5. Give the coordinates of another point that falls on line ℓ with a y-coordinate greater than 20.

Name ______________________________ Date ________________

Complete the chart. Then, plot the points on the coordinate plane.

x	y	(x, y)
0	4	
2	6	
3	7	
7	11	



1. Use a straightedge to draw a line connecting these points.

2. Write a rule to show the relationship between the x- and y-coordinates for points on the line.

3. Name two other points that are also on this line. __________ __________

Name ____ Date ______________________

1. Complete the tables for the given rules.

Line ℓ

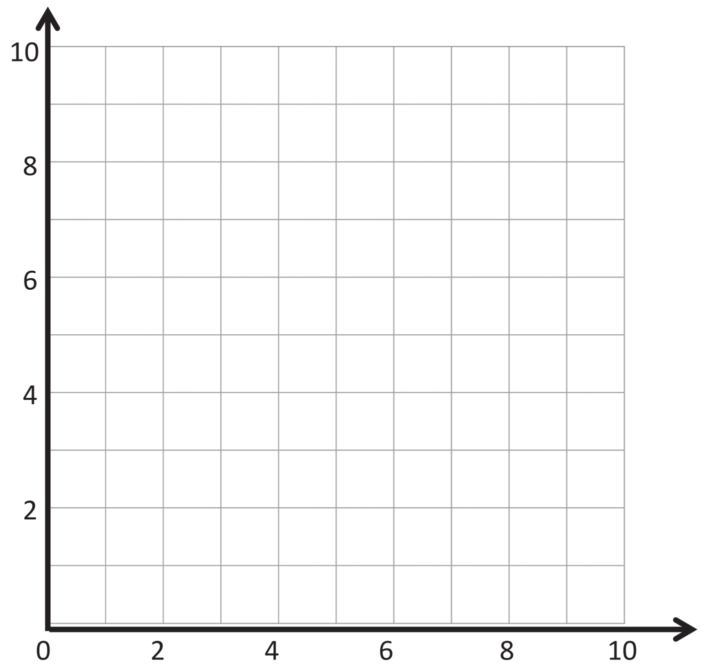
Rule: *Triple x*

x	y	(x, y)
0		
1		
2		
3		

Line m

Rule: *Triple x, and then add 1*

x	y	(x, y)
0		
1		
2		
3		



a. Draw each line on the coordinate plane above.

b. Compare and contrast these lines.

2. Circle the point(s) that the line for the rule *multiply x by $\frac{1}{3}$, and then add 1* would contain.

$(0, \frac{1}{2})$ $(1, 1\frac{1}{3})$ $(2, 1\frac{2}{3})$ $(3, 2\frac{1}{2})$

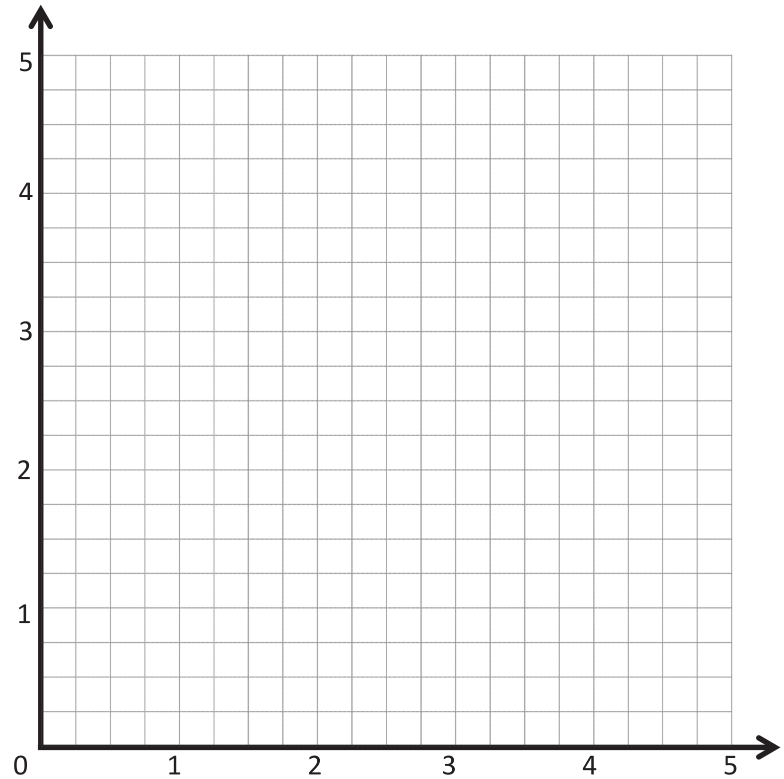
Name ______________________________ Date ________________

Write the rule for the line that contains the points $(0, 1\frac{1}{2})$ and $(1\frac{1}{2}, 3)$.

a. Identify 2 more points on this line. Draw the line on the grid.

Point	x	y	(x, y)
B			
C			

b. Write a rule for a line that is parallel to $\overleftrightarrow{BC}$ and goes through point $(1, \frac{1}{2})$.



Fact Strategies

Strategy Name	Description	Example	What Students Should "Think in their Head"
Zero Property	Anything times 0 equals 0.	7 x 0	"Since 0 is a factor the answer is 0."
Identity Property	Anything times 1 equals the number itself.	1 x 8	"Since 1 is a factor the answer is 8."
Doubles	Anything times 2 is the same as addition doubles	5 x 2	"Five plus five is 10 so 5 x 2 = 10."
Clock 5s	Think of a clock. The number the minute hand points to represents that many sets of "five minutes" past the hour.	7 x 5	"I know when the minute hand in on the 6 it is 30 minutes past the hour, so when it is on the 7 it is 5 minutes MORE, or 35 minutes past the hour. So 7 x 5 = 35."
Nine Facts	Answers to nine facts are always in the "tens" right before the other factor (i.e. 8 x 9 is in the 70s, 6 x 9 is in the 50s), and the digits of the answer always add up to 9.	9 x 8	"I know the answer is in the 70s, so it must be 72 since 7 + 2 = 9."
Doubles Doubles	Multiplication strategy for 4s. When multiplying by 4, just double the other factor, and then double it again.	4 x 7	"7 doubled is 14, 14 doubled is 28, so 7 x 4 = 28."
Doubles Plus One Set	Multiplication strategy for 3s. When multiplying by 3, just double the other factor, and then add one more set of the other factor.	3 x 6	"6 doubled is 12, plus 6 is 18."
Five Plus One Set	Multiplication Strategy for 6s. Kids use what they know about 5 facts to answer 6 facts.	6 x 8	"I don't know what 6 times 8 is, but I DO know that 5 x 8 is 40, plus one more set of 8 is 48."
Think Multiplication	Students use what they know about multiplication and fact family relationships to answer division facts.	45/5	"What times 5 is 45? 9! So 45/5 = 9."

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