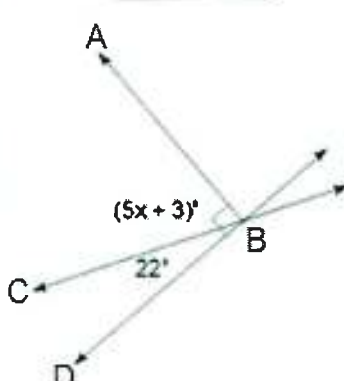
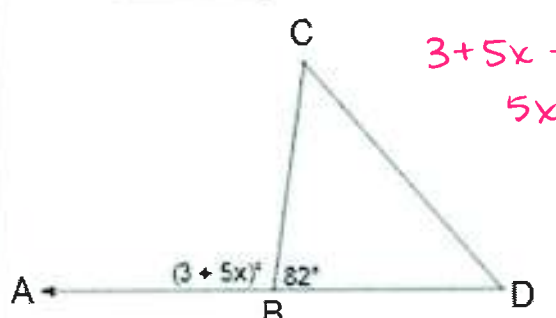
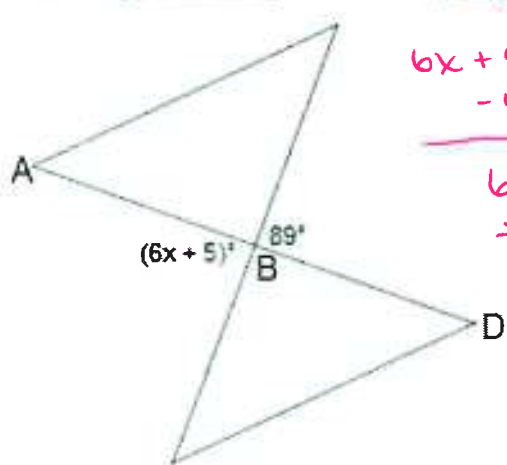
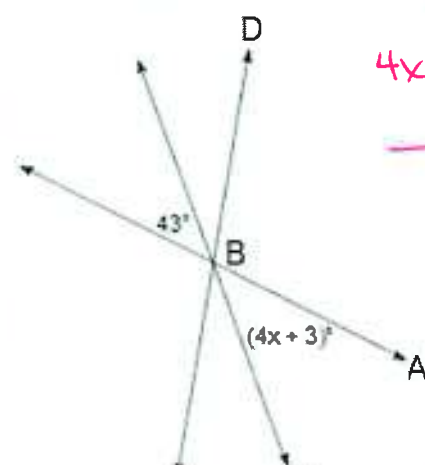
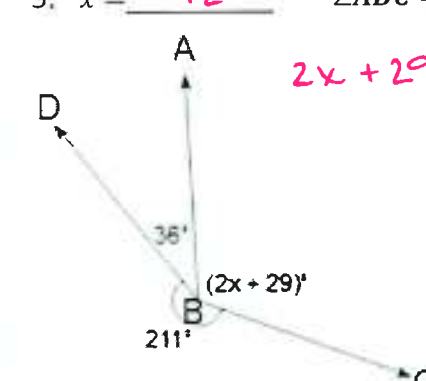
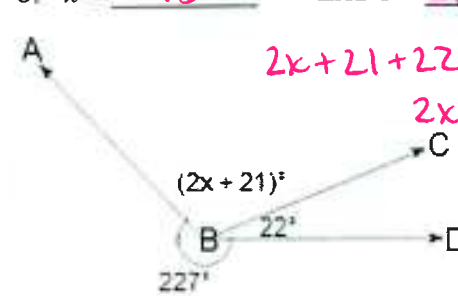


Angle Relationships (7.G.5)

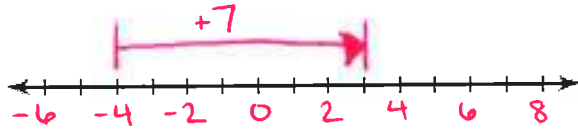
For each problem, write and solve an equation to find the value of x . Then, use that value to find the measure of $\angle ABC$. The diagrams are not to scale.

<p>1. $x = 13^\circ$ $\angle ABC = 5(13) + 3 = 68^\circ$</p>  $5x + 3 + 22 = 90$ $5x + 25 = 90$ $\underline{-25 \quad -25}$ $5x = 65$ $\underline{\div 5 \quad \div 5}$ $x = 13$	<p>2. $x = 19^\circ$ $\angle ABC = 3 + 5(19) = 98^\circ$</p>  $3 + 5x + 82 = 180$ $5x + 85 = 180$ $\underline{-85 \quad -85}$ $5x = 95$ $\underline{\div 5 \quad \div 5}$ $x = 19$
<p>3. $x = 14^\circ$ $\angle ABC = 6(14) + 5 = 89^\circ$</p>  $6x + 5 = 89$ $\underline{-5 \quad -5}$ $6x = 84$ $\underline{\div 6 \quad \div 6}$ $x = 14$	<p>4. $x = 10^\circ$ $\angle ABC = 4(10) + 3 = 43^\circ$</p>  $4x + 3 = 43$ $\underline{-3 \quad -3}$ $4x = 40$ $\underline{\div 4 \quad \div 4}$ $x = 10$
<p>5. $x = 42^\circ$ $\angle ABC = 2(42) + 29 = 113^\circ$</p>  $2x + 29 + 36 + 211 = 360$ $2x + 276 = 360$ $\underline{-276 \quad -276}$ $2x = 84$ $\underline{\div 2 \quad \div 2}$ $x = 42$	<p>6. $x = 45^\circ$ $\angle ABC = 2(45) + 21 = 111^\circ$</p>  $2x + 21 + 22 + 227 = 360$ $2x + 270 = 360$ $\underline{-270 \quad -270}$ $2x = 90$ $\underline{\div 2 \quad \div 2}$ $x = 45$

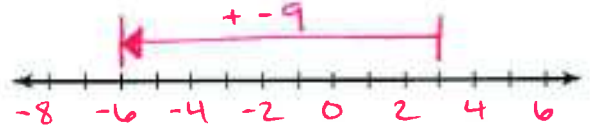
Real World Addition and Subtraction (7.NS.1b, 7.NS.1c)

Model the following number sentences using a number line. Find the answer to the number sentence.

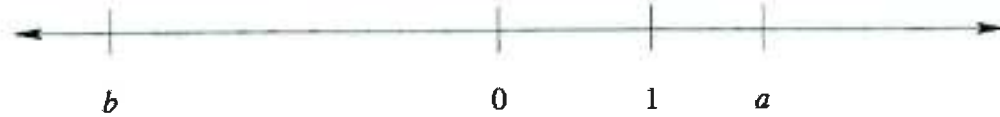
1. $-4 + 7 = 3$



2. $3 + -9 = -6$



3. A number line is shown below. The numbers 0 and 1 are marked on the line, as are two other numbers, a and b . Assume the number line is drawn to scale.



Using the number line above, decide if each answer will be positive, negative, or zero.

$a + b =$ negative

$b + 1 =$ negative

$a + -b =$ positive

$a + -2 =$ negative

4. Decide whether each of the following statements is *true* or *false*. Give examples to support your choice.

A. The sum of two negative numbers is always negative.

true $-2 + -2 = -4$

B. The sum of a positive number and a negative number is always negative.

false $10 + -1 = 9$ $5 + -7 = -2$

C. The difference of two negative numbers is always negative.

false $-2 -- 10 = 8$ $-9 -- 5 = -4$

D. A negative number minus a positive number is always negative.

true $-2 - 10 = -12$

5. Write two absolute value expressions for the distance between the two points on the number line below. Then, find the value of each expression.



$|-8 -- 4| = |-4| = 4$

$|-4 -- 8| = |-4| = 4$

6. For the pair of points below, write and evaluate two absolute value expressions to represent the distance between the points. Then, make a number line to show the distance between the points.

7 and -3



$|7 -- -3| = |10| = 10$

$|-3 - 7| = |-10| = 10$

Which of the following expressions below are equivalent to $-15 + 12$? Circle ALL that apply.

A. $12 + 15$

B. $15 + -12$

C. $-15 -- 12$

D. $-15 - 12$

Addition and Subtraction of Rational Numbers (7.NS. 1d)Find each sum or difference. Show work for problems with fractions and decimals.

1. $-8 + -11 = -19$

2. $12 - 30 = -18$

3. $16 + -4 = 12$

4. $-15 - -7 = -8$

5. $-6 + -9 = -15$

6. $-3 - 5 = -8$

7. $-4 + 11 = 7$

8. $-6 - -14 = 8$

9. $8 + -15 = -7$

10. $-11.8 + 2.6 = -9.2$

$$\begin{array}{r} 11.8 \\ -2.6 \\ \hline 9.2 \end{array}$$

11. $-6.1 - 3.998 = -10.098$

$$\begin{array}{r} 6.100 \\ +3.998 \\ \hline 10.098 \end{array}$$

12. $-5.8 - -4.79 = -1.01$

$$\begin{array}{r} 5.80 \\ -4.79 \\ \hline 1.01 \end{array}$$

13. $8.4 + -1.61 = 6.79$

$$\begin{array}{r} 8.40 \\ -1.61 \\ \hline 6.79 \end{array}$$

14. $\frac{2}{3} - -2\frac{4}{9} = 3\frac{1}{9}$ OR $\frac{28}{9}$

$$\frac{6}{9} + \frac{22}{9} = \frac{28}{9}$$

15. $3\frac{3}{5} + -2\frac{1}{2} = 1\frac{1}{10}$ OR $\frac{11}{10}$

$$\frac{18}{5} - \frac{5}{2} = \frac{36}{10} - \frac{25}{10} = \frac{11}{10}$$

16. $-1\frac{1}{3} + 1\frac{4}{11} = \frac{1}{33}$

$$-\frac{4}{3} + \frac{15}{11} = \frac{-44}{33} + \frac{45}{33} = \frac{1}{33}$$

17. $-3\frac{1}{6} - -2\frac{4}{9} = -\frac{13}{18}$

$$-\frac{19}{6} + \frac{22}{9} = \frac{-57}{18} + \frac{44}{18} = \frac{-13}{18}$$

Real World Multiplication and Division (7.NS.2a, 7.NS.2b)

1. Use the distributive property to write an expression equal to each of the following expression.

a. $-3(7 + -9)$

$$-3 \cdot 7 + -3 \cdot -9$$

b. $(-2 \cdot -6) - (-2 \cdot -11)$

$$-2(-6 - -11)$$

2. Mark takes 6 friends to play paintball. It costs \$10.25 to play and \$8.75 to rent the equipment, per person. Include units with your answer.

- a. Using your understanding of the distributive property, write TWO equivalent number sentences (one factored and one expanded) that would find the total cost for all seven people.

$$7(10.25 + 8.75)$$

$$7 \cdot 10.25 + 7 \cdot 8.75$$

- b. What is the total cost for all seven people? Show your work and include units.

$$\begin{array}{r} 10.25 \\ + 8.75 \\ \hline 19.00 \end{array}$$

$$\begin{array}{r} 19 \\ \times 7 \\ \hline 133 \end{array}$$

$$\boxed{\$133}$$

3. A football team loses an average of 3 yards per play. How many yards have they lost after 4 plays? Show your work and include units with your answer.

$$-3 \cdot 4 = \boxed{-12 \text{ yards}}$$

4. Select ALL values equal to $-\frac{2}{9}$.

A. $-\frac{2}{9}$

B. $-\frac{2}{-9}$

C. $\frac{-2}{-9}$

D. $\frac{-2}{9}$

E. $\frac{2}{-9}$

5. Together, siblings Brandon, Brooke, Trent, and Trisha owe their parents \$100. How much does each sibling owe if they share the debt equally? Show your work and include units with your answer.

$$-100 \div 4 = \boxed{-\$25}$$

Multiplication and Division of Rational Numbers (7.NS.2c, 7.NS.2d)

Find each quotient or product. Show work for problems with fractions and decimals.

1. $-8 \cdot 6 = -48$

2. $\frac{-45}{-5} = 9$

3. $-12 \cdot -4 = 48$

4. $-15 \div 3 = -5$

5. $7 \cdot -4 = -28$

6. $60 \div -6 = -10$

7. $8.31 \cdot -3.4 = -28.254$

$$\begin{array}{r} 8.31 \\ \times 3.4 \\ \hline 3324 \\ + 24930 \\ \hline 28254 \end{array}$$

8. $-3.3 \div 4 = -0.825$

$$\begin{array}{r} 0.825 \\ 4 \overline{) 3.300} \\ \underline{-32} \\ 10 \\ \underline{-8} \\ 20 \\ \underline{-20} \\ 0 \end{array}$$

9. $-7.7 \cdot -1.5 = 11.55$

$$\begin{array}{r} 7.7 \\ \times 1.5 \\ \hline 385 \\ + 770 \\ \hline 1155 \end{array}$$

10. $5\frac{5}{6} \div -3\frac{1}{3} = -\frac{7}{4} \text{ or } -1\frac{3}{4}$

$$\frac{35}{6} \div \frac{-10}{3}$$

$$\frac{35}{6} \cdot \frac{-3}{10} = \frac{-105}{60} = -\frac{7}{4}$$

11. $-1\frac{1}{4} \cdot 1\frac{1}{2} = -\frac{15}{8} \text{ or } -1\frac{7}{8}$

$$-\frac{5}{4} \cdot \frac{3}{2} = -\frac{15}{8}$$

12. $-1\frac{1}{2} \div -5\frac{2}{5} = \frac{5}{18}$

$$-\frac{3}{2} \div \frac{-27}{5}$$

$$-\frac{3}{2} \cdot \frac{-5}{27} = \frac{15}{54} = \frac{5}{18}$$

Find the decimal equivalent. Show your work.

13. $\frac{-7}{-12} = 0.58\overline{3}$

$$\begin{array}{r} 0.5833 \\ 12 \overline{) 7.0000} \\ \underline{-60} \\ 100 \\ \underline{-96} \\ 40 \\ \underline{-36} \\ 40 \\ \underline{-36} \\ 4 \end{array}$$

14. $\frac{5}{-8} = -0.625$

$$\begin{array}{r} 0.625 \\ 8 \overline{) 5.000} \\ \underline{-48} \\ 20 \\ \underline{-16} \\ 40 \\ \underline{-40} \\ 0 \end{array}$$

15. $\frac{-11}{3} = -3.\overline{6}$

$$\begin{array}{r} 3.66 \\ 3 \overline{) 11.00} \\ \underline{-9} \\ 20 \\ \underline{-18} \\ 20 \\ \underline{-18} \\ 2 \end{array}$$

16. $\frac{-13}{-8} = 1.625$

$$\begin{array}{r} 1.625 \\ 8 \overline{) 13.000} \\ \underline{-8} \\ 50 \\ \underline{-48} \\ 20 \\ \underline{-16} \\ 40 \\ \underline{-40} \\ 0 \end{array}$$

Order of Operations (7.NS.3)

Find the value of each expression. Show all steps.

1. $-12 \div -2 \cdot (4 - 5)$

$$\underline{-12 \div -2 \cdot (-1)}$$

$$6 \cdot -1$$

$$\underline{-6}$$

2. $2 - 6 - (-1 + 12 \div 3)$

$$2 - 6 - (-1 + 4)$$

$$\underline{2 - 6 - 3}$$

$$-4 - 3$$

$$\underline{-7}$$

3. $-4 \cdot -1 + (2 - -5)^2$

$$\underline{-4 \cdot -1 + 7^2}$$

$$\underline{-4 \cdot -1 + 49}$$

$$4 + 49$$

$$\underline{53}$$

4. $6 - (16 \div (5 - 3)^2 + 5)$

$$6 - (16 \div 2^2 + 5)$$

$$6 - (16 \div 4 + 5)$$

$$6 - (4 + 5)$$

$$6 - 9$$

$$\underline{-3}$$

5. $-3\frac{1}{6} \cdot (\frac{3}{2} - -1\frac{3}{4} - 2\frac{1}{4})$

$$\underline{-3\frac{1}{6} \cdot (\frac{6}{4} - -\frac{7}{4} - 2\frac{1}{4})}$$

$$\underline{-3\frac{1}{6} \cdot (\frac{13}{4} - \frac{9}{4})}$$

$$\underline{-\frac{19}{6} \cdot (\frac{4}{4})}$$

$$\underline{-\frac{19}{6} \cdot 1}$$

$$\underline{-\frac{19}{6} \text{ or } -3\frac{1}{6}}$$

6. $3.1 \cdot (-2.3 - 0.4) - 1.083$

$$\underline{3.1 \cdot -2.7 - 1.083}$$

$$-8.37 - 1.083$$

$$\underline{-9.453}$$


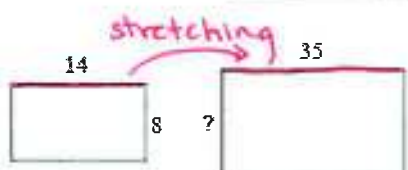
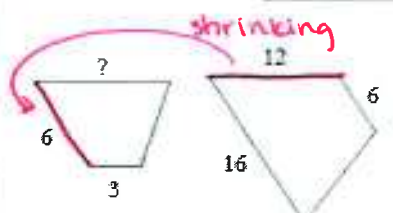
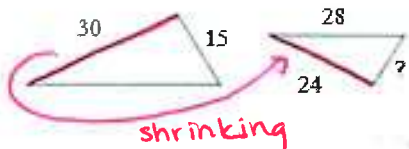
$$\begin{array}{r} 2.3 \\ + 0.4 \\ \hline 2.7 \end{array}$$

$$\begin{array}{r} 3.1 \\ \times 2.7 \\ \hline 217 \\ + 620 \\ \hline 837 \end{array}$$

$$\begin{array}{r} 8.370 \\ + 1.083 \\ \hline 9.453 \end{array}$$

Similar Figures Problems (7.G.1 Solve)

Each pair of polygons are similar. Find the missing side length. Show your work to find and use scale factor.

<p>1. scale factor $\frac{1}{3}$ missing side <u>7 units</u>  24 corresponds with 8, so $SF = 8 \div 24 = \frac{1}{3}$ 21 corresponds with $?$, so $? = 21 \cdot \frac{1}{3} = 7$</p>	<p>2. scale factor <u>2.5</u> missing side <u>20 units</u>  35 corresponds with 14, so $SF = 35 \div 14 = 2.5$ 8 corresponds with $?$, so $? = 8 \cdot 2.5 = 20$</p>
<p>3. scale factor <u>0.5</u> missing side <u>8 units</u>  12 corresponds with 6, so $SF = 6 \div 12 = 0.5$ 16 corresponds with $?$, so $? = 16 \cdot 0.5 = 8$</p>	<p>4. scale factor <u>0.8</u> missing side <u>12 units</u>  30 corresponds with 24, so $SF = 24 \div 30 = 0.8$ 15 corresponds with $?$, so $? = 15 \cdot 0.8 = 12$</p>

5. A figure has a perimeter of 35 meters and an area of 75 meters². A larger similar figure is created using a scale factor of 2.5.

a. What is the perimeter of the larger figure? Show your work.

$$35 \cdot 2.5 = \boxed{87.5 \text{ meters}}$$

b. What is the area of the larger figure? Show your work.

$$75 \cdot 2.5^2 = 75 \cdot 6.25 = \boxed{468.75 \text{ meter}^2}$$

6. A figure has a perimeter of 30 feet and an area of 54 feet². A smaller similar figure is created using a scale factor of 0.75.

a. What is the perimeter of the smaller figure? Show your work.

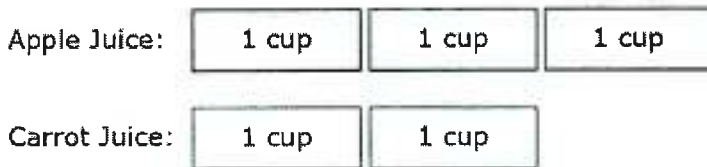
$$30 \cdot 0.75 = \boxed{22.5 \text{ ft}}$$

b. What is the area of the smaller figure? Show your work.

$$54 \cdot 0.75^2 = 54 \cdot 0.5625 = \boxed{30.375 \text{ ft}^2}$$

Unit Rates (7.RP.1)

1. This diagram shows how much apple juice is mixed with carrot juice for a recipe.



How many cups of apple juice are used for 1 cup of carrot juice? Show your work to find this unit rate and include units.

$$\frac{3 \text{ cups apple}}{2 \text{ cups carrot}} = \frac{x \text{ cups apple}}{1 \text{ cup carrot}}$$

↘
•0.5

$$x = 3 \cdot 0.5 =$$

1.5 cups apple juice
per 1 cup carrot
juice

2. For a drink recipe, there is a ratio of 3 gallons mango juice to 12 gallons of peach juice.

How many gallons of mango juice are used for 1 gallons of peach juice? Show your work to find this unit rate and include units.

$$3 \text{ gallons mango juice} \div 12 \text{ gallons peach juice}$$

= 0.25 or $\frac{1}{4}$ gallons mango juice per 1 gallon peach juice

3. The train ride at the zoo covers a distance of $3\frac{1}{4}$ miles in $\frac{1}{3}$ of an hour.

How many miles per hour does the train go? Show your work to find this unit rate and include units.

$$3\frac{1}{4} \text{ miles} \div \frac{1}{3} \text{ hour} = 9\frac{3}{4} \text{ or } 9.75 \text{ miles per hour}$$

Proportional Relationships (7.RP.2a)

1. Circle **ALL** the tables below that represent a proportional relationship between x and y .

~~A.~~

x	y
1	4
2	7
3	10
4	13

$\frac{1}{4} \neq \frac{2}{7}$

B.

x	y
1	4
2	8
3	12
4	16

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

~~C.~~

x	y
1	6
2	7
3	8
4	9

$\frac{1}{6} \neq \frac{2}{7}$

~~D.~~

x	y
5	-2
7	0
9	2
11	4

$\frac{9}{2} \neq \frac{11}{4}$

E.

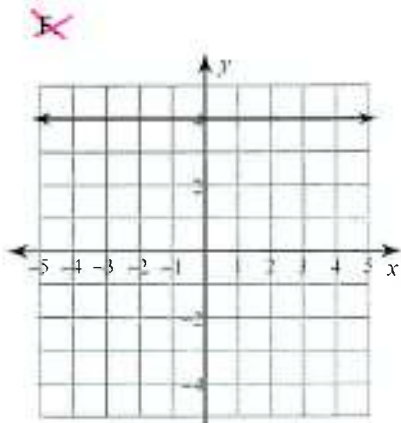
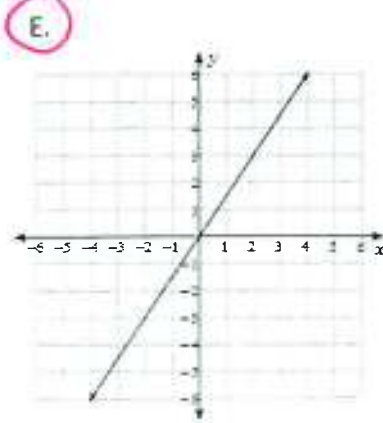
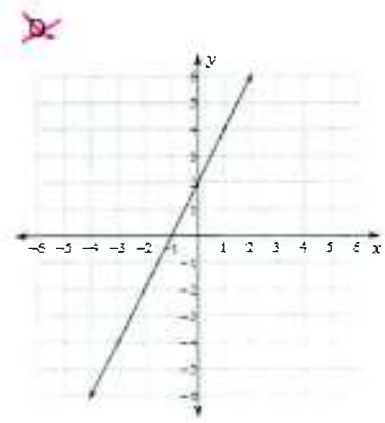
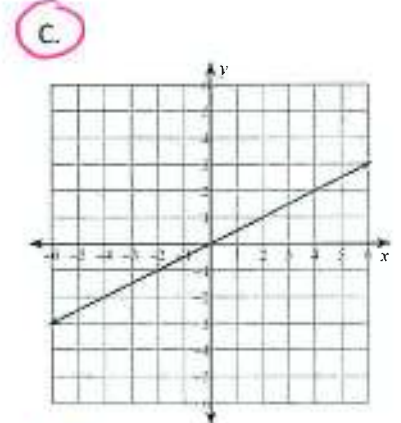
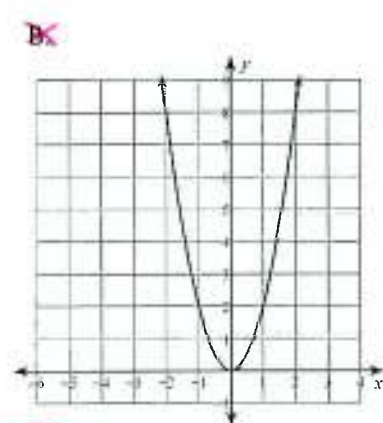
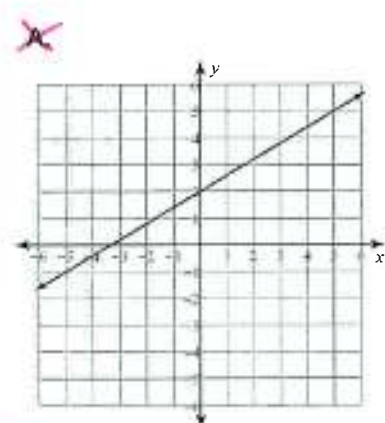
x	y
3	12
5	20
2	8
8	32

$\frac{2}{8} = \frac{8}{32}$

2. Explain how you know if a TABLE represents a proportional relationship.

The table has equivalent ratios between the values.

3. Circle **ALL** the graphs below that show a proportional relationship between x and y .



4. Explain how you know if a GRAPH represents a proportional relationship.

The graph is a straight line through (0,0).

Proportional Relationship Equations (7.RP.2c)

1. The following tables show a proportional relationship between x and y.

A.

x	y
1	$\cdot 4$ 4
2	$\cdot 4$ 8
3	$\cdot 4$ 12
4	$\cdot 4$ 16

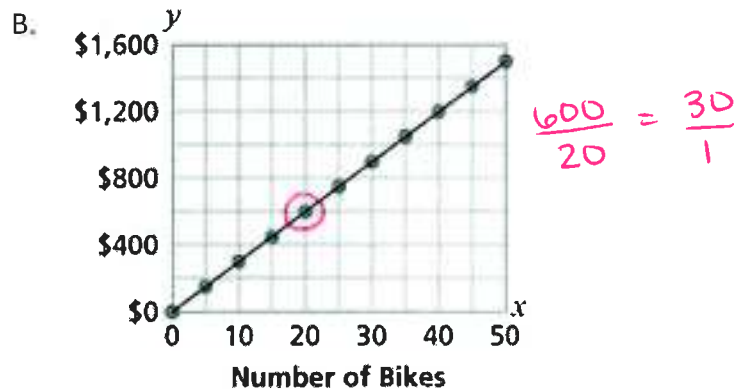
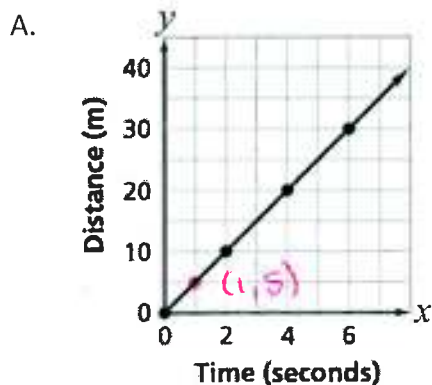
B.

x	y
3	$\cdot 4$ 12
5	$\cdot 4$ 20
2	$\cdot 4$ 8
8	$\cdot 4$ 32

a. Write an equation of the form $y = rx$ to represent table A. $y = 4x$

b. Write an equation of the form $y = rx$ to represent table B. $y = 4x$

2. The following graphs show a proportional relationship between x and y.



a. Write an equation of the form $y = rx$ to represent graph A. $y = 5x$

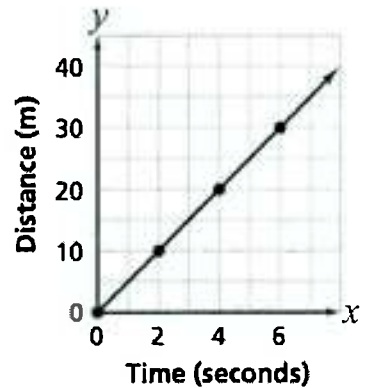
b. Write an equation of the form $y = rx$ to represent graph B. $y = 30x$

Explaining Coordinate Points (7.RP.2d)

1. The graph at right shows a proportional relationship between x and y .

What do the following points represent in terms of the situation?

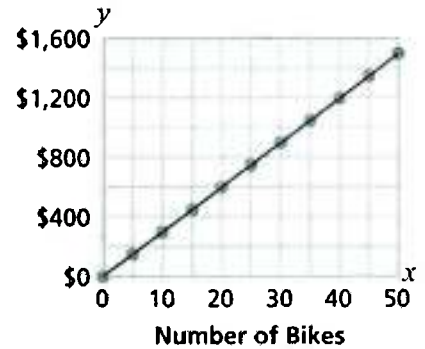
- (0, 0) You have traveled 0 meters after 0 seconds.
- (1, 5) You have traveled 5 meters after 1 second.
- (6, 30) You have traveled 30 meters after 6 seconds.



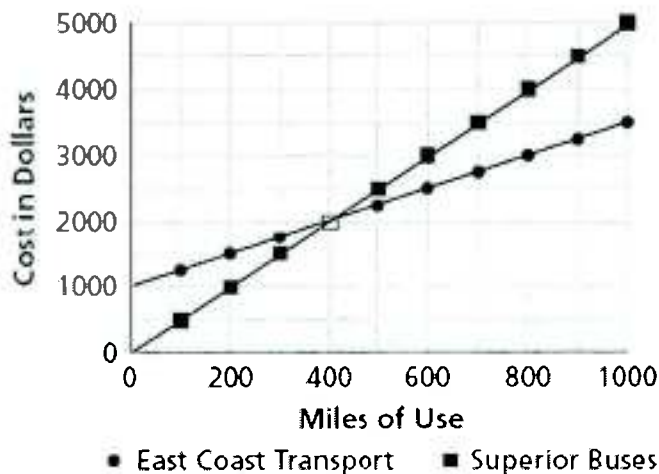
2. The graph at right shows a proportional relationship between x and y .

What do the following points represent in terms of the situation?

- (0, 0) 0 bikes cost \$0.
- (1, 30) 1 bike costs \$30.
- (40, 1200) 40 bikes cost \$1200.



3. The following graph for Superior Buses shows a proportional relationship between x and y .



Select True or False for each statement about the graph.

Statement	True	False
Point \square represents the total cost of travel when traveling for 400 miles.	X	
The total cost of travel is \$5 when traveling for 1 mile.	X	
The total cost of travel is \$600 when traveling for 3000 miles.		X

Multi-Step Proportion Problems (7.RP.3)

1. The ratio of blueberries to mango in a fruit smoothie drink is 5 to 15. What percent of the drink is mango? Write and solve a proportion to find the answer, and include units.

$5 + 15 = 20$ total

$$\frac{15 \text{ mango}}{20 \text{ total}} = \frac{x\%}{100\%} \quad x = 15 \cdot 5 = 75$$

$\cdot 5$

75% mango

2. Bill has a paper route in his neighborhood. It takes him 45 minutes to deliver newspapers to the 30 customers on his route. How long will it take Bill to complete his route if he adds 25 more customers in his neighborhood? Write and solve a proportion to find the answer, and include units.

$30 + 25 = 55$ customers

$$\frac{45 \text{ min}}{30 \text{ customers}} = \frac{x \text{ min}}{55 \text{ customers}}$$

$\cdot \frac{5}{6}$

82 1/2 minutes

$x = 45 \cdot 1 \frac{5}{6} = 82 \frac{1}{2}$

3. You have lunch at a Thai restaurant with your friends. The bill before tax is \$54.75, and the sales tax is 7%. You decide to leave a 20% tip for the waitress based on the pre-tax amount. What will be the amount of the total bill, including tax and tip? Write and solve proportions to find the answer, and include units.

$$\begin{array}{r} 58.5825 \\ + 10.9500 \\ \hline 69.5325 \end{array}$$

$$\frac{\$54.75}{100\%} = \frac{\$x}{107\%}$$

$\cdot 1.07$

$x = 54.75 \cdot 1.07 = \$58.5825$

$$\frac{\$54.75}{100\%} = \frac{\$x}{20\%}$$

$\cdot 0.2$

$x = 54.75 \cdot 0.2 = \$10.95$

\$69.53

4. Shirts Galore sells a Batman shirt for \$24.49, but is having a sale for 25% off. Rainbow Shirts sells the same Batman shirt for \$21.99, but is having a sale for 15% off. Which store offers the better price, after the discount? Write and solve proportions to find the answer, and include units with your answer.

SG: $\frac{\$24.49}{100\%} = \frac{\$x}{25\%}$

$\cdot 0.25$

$x = 24.49 \cdot 0.25 = \$6.1225$

$24.49 - 6.1225 = \$18.3675$

or
\$18.37

RS: $\frac{\$21.99}{100\%} = \frac{\$x}{15\%}$

$\cdot 0.15$

$x = 21.99 \cdot 0.15 = \$3.2985$

$21.99 - 3.2985 = \$18.6915$

or
\$18.69

Shirts Galore offers the better price.