4.3

Graphing Proportional Relationships

Today's Learning Goals:

- **Write and graph proportional relationships.**

## Reviewing and Expanding

Write an equation for the function

1)

x	y
3	6
4	8
5	10
6	12

2)

x	y
7	11
10	14
13	17
16	20

3)

x	y
7	35
8	40
9	45
10	50

4)

x	y
8	6
12	8
16	10
20	12

5)

x	y
8	6
11	9
14	12
17	15

6)

x	y
4	16
6	24
8	32
10	40

Direct Variation (Proportional Relationship)

A direct variation or **proportional relationship** is a relationship between two quantities. There is a clear number being multiplied to **x** to get **y**.
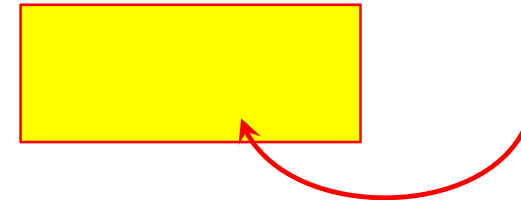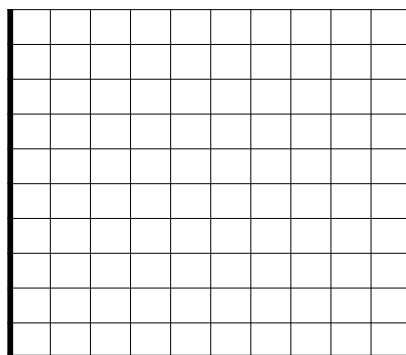
- **The constant of proportionality on a graph is also known as the _____ .**
- **The graph of proportional relationship is always positive and always goes through the origin.**

Exploring

Let's say you go to Jack in the Box. You get 1 burger for every 2 dollars dollar.

1) Make a T-chart of this relationship if **x** represents the number of burgers and **y** represents the cost.

2) Make a line graph of this with at least three points and make sure to label the graph.

3) Look at your T-chart, what did you have to multiply to the **x** values to get a **y** value.

4) Write an equation showing this this relationship.

Direct Variation By Finding "k"

Tell whether *x* and *y* show direct variation. Explain your reasoning.
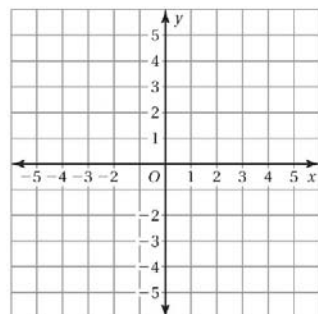
a.

x	1	2	3	4
y	−2	0	2	4

b.

x	0	2	4	6
y	0	2	4	6

Direct Variation Using a Graph

Tell whether *x* and *y* show direct variation. Explain your reasoning.

a.

x	1	2	3	4
y	−2	0	2	4

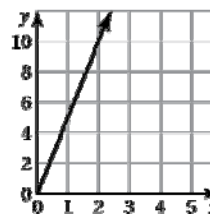b.

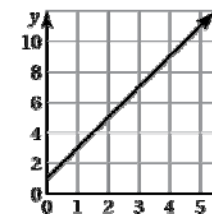| x	0	2	4	6
y	0	2	4	6
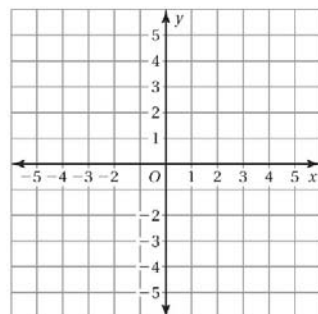
Practice

Tell whether *x* and *y* are in a proportional relationship. Explain your reasoning. If so, write an equation that represents the relationship.

1)

2)

Practice

Tell whether x and y are in a proportional relationship. Explain your reasoning. If so, write an equation that represents the relationship.
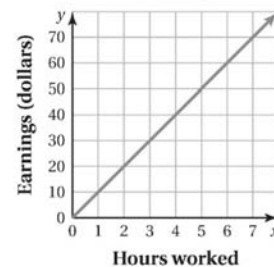
3)

x	1	3	6	8
y	3	6	8	11

4)

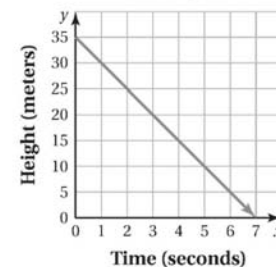| x	4	8	12	16
y	2	4	6	8

On Your Own

Work with a partner. Tell whether x and y are in a proportional relationship. Explain your reasoning.
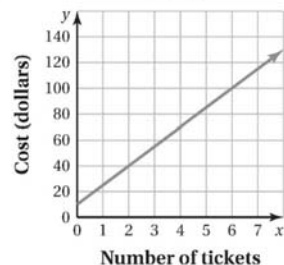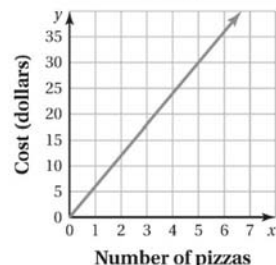
a. Money

b. Helicopter

On Your Own

Work with a partner. Tell whether x and y are in a proportional relationship. Explain your reasoning.

c. Tickets

d. Pizzas

On Your Own

Work with a partner. Tell whether x and y are in a proportional relationship. Explain your reasoning.

e.

Laps, x	1	2	3	4
Time (seconds), y	90	200	325	480

f.

Cups of Sugar, x	$\frac{1}{2}$	1	$1\frac{1}{2}$	2
Cups of Flour, y	1	2	3	4

Application

The cost _y_ (in dollars) for _x_ gigabytes of data on an Internet plan is represented by _y_ = 10_x_. Graph the equation and interpret the slope.

1) Make a T-chart of this relationship if **_x_** represents the number of gigabytes and **_y_** represents the cost.
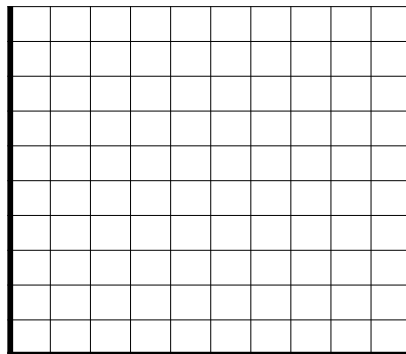
2) Make a line graph of this with at least three points and make sure to label the graph.

3) What is **_k_**?　　　4) What is the slope?　　　5) What does the slope mean?

Practice

The cost _y_ (in dollars) to rent a lane at the bowling alley is proportional to the number _x_ of hours that you rent the lane. It costs $18 to rent the lane for 2 hours.
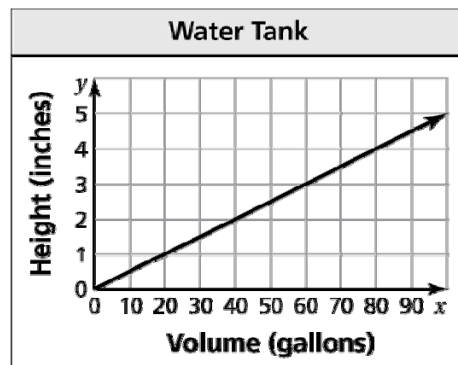
   a. Write an equation that represents the situation.

   b. Interpret the slope.

   c. How much does it cost to rent the lane for 3 hours?

Practice

The graph relates the height of the water in a tank y (in inches) to the volume of the water x (in gallons).

  a. Is the relationship proportional? Explain.

  b. Write an equation of the line. Interpret the slope.

Water Tank

y-axis: Height (inches) 0 1 2 3 4 5
x-axis: Volume (gallons) 0 10 20 30 40 50 60 70 80 90 x

  c. What is the height of the water in the tank when the volume is 250 gallons?