4.3

Graphing 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**.

$$y = mx$$

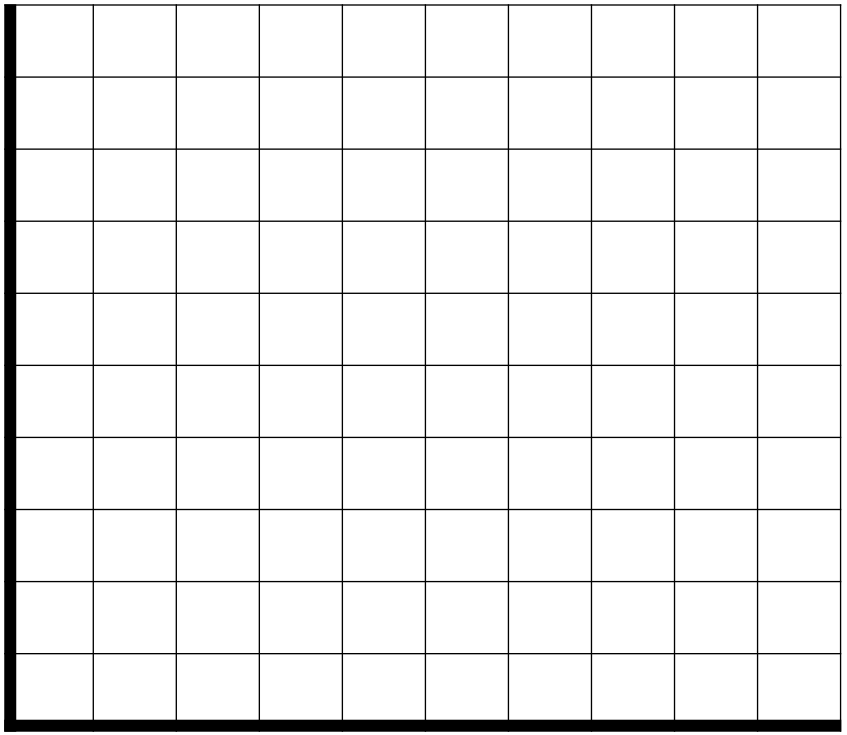
Constant of Proportionality

- **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.

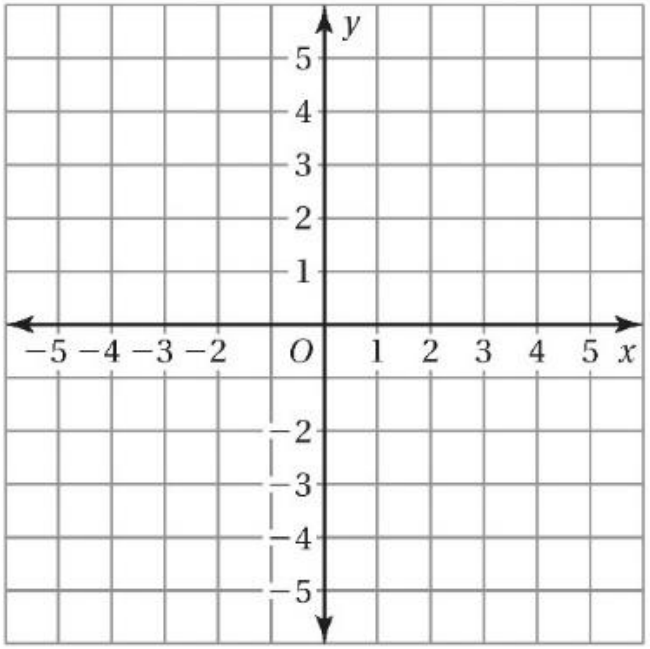
x	0	2	4	6
y	0	2	4	6

Direct Variation Using a Graph

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

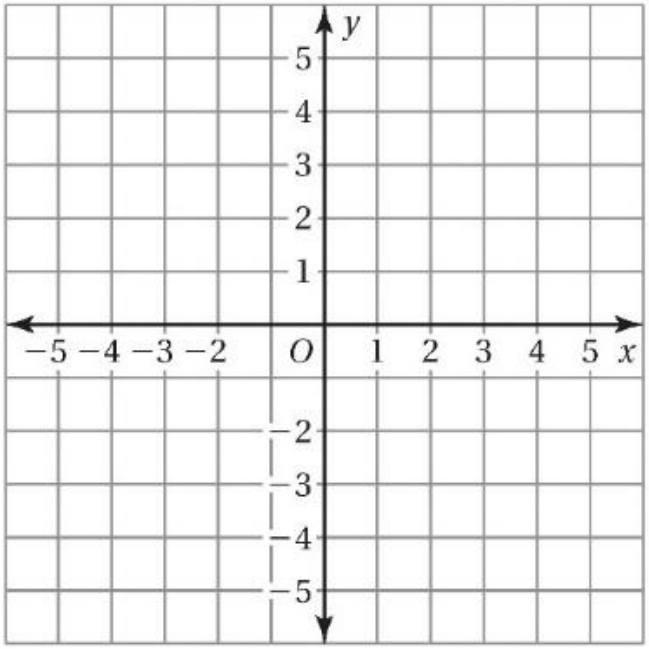
a.

x	1	2	3	4
y	-2	0	2	4



b.

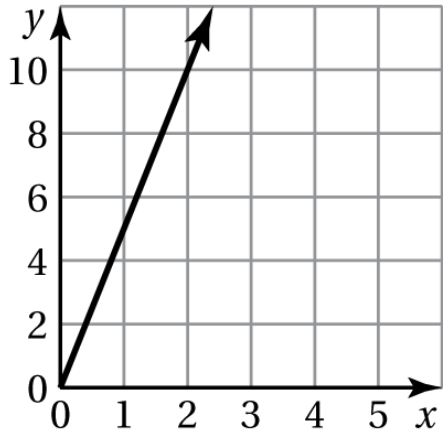
x	0	2	4	6
y	0	2	4	6



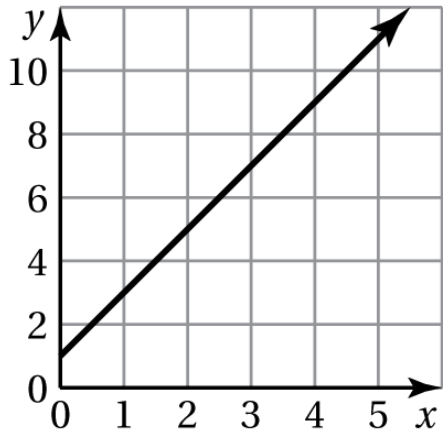
Practice

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

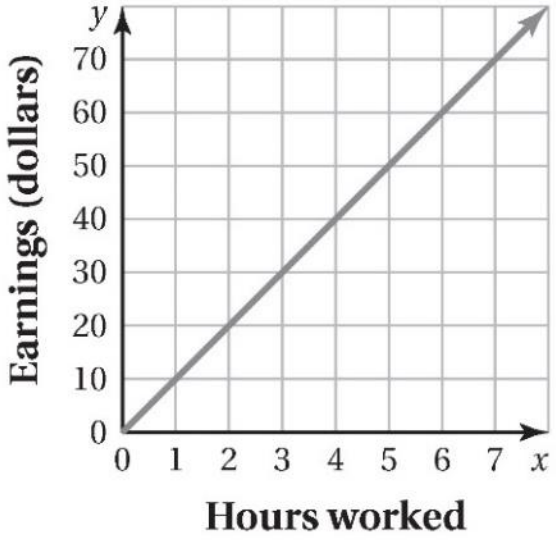
4)

x	4	8	12	16
y	2	4	6	8

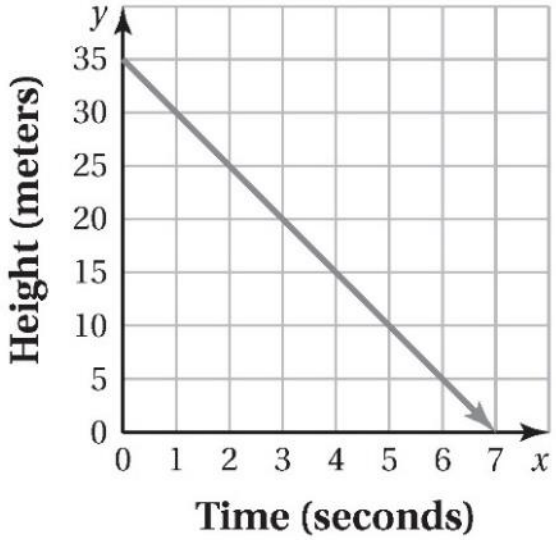
On Your Own

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

a. **Money**



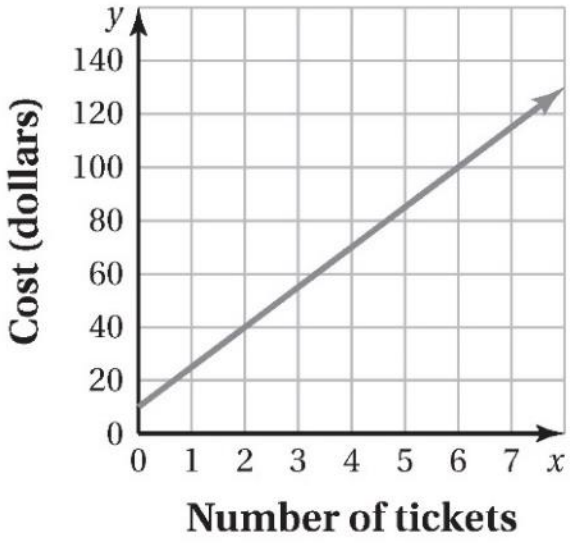
b. **Helicopter**



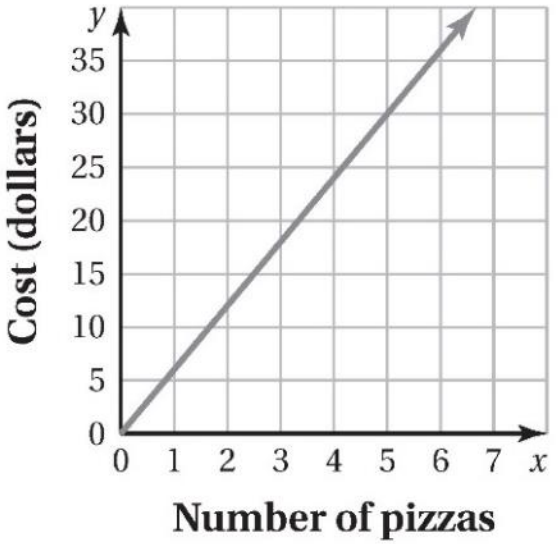
On Your Own

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

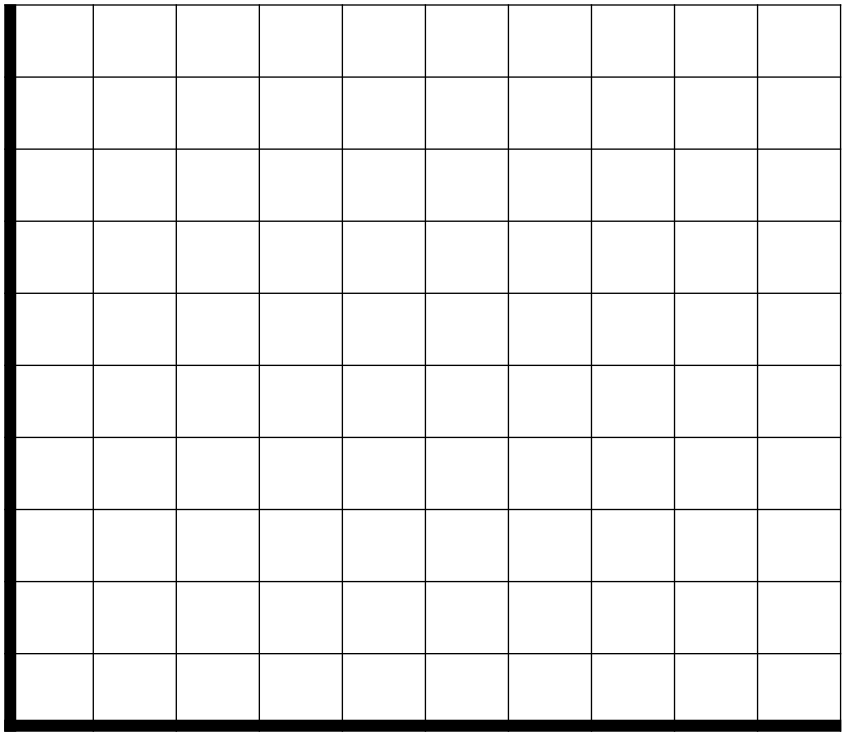
f.

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.

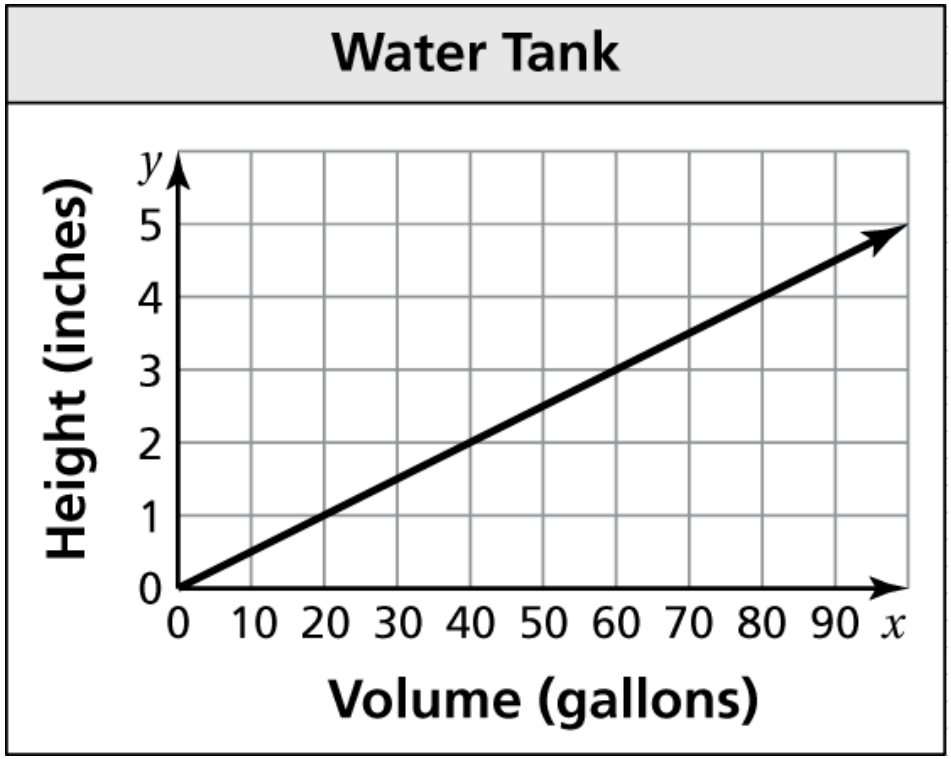
a. Write an equation that represents the situation.

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.**

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