4.3

Graphing Proportional Relationships

Review

Solve for x.

1) $\frac{x}{21} = \frac{3}{9}$

2) $\frac{4}{x} = \frac{8}{20}$

Review

Solve for x.

3) $2(x-4)=6$

4) $7(x-9)=-77$

Review

1) Cross-multiply
2) Solve like a multi-step equation

Examples

5) $\frac{2}{5} = \frac{4}{x+1}$

6) $\frac{21}{y-8} = 3$

FINDING MISSING NUMBERS

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Find the value of k so that the line passes on the following point with the given slope.

7) $(2,3)$ ***and*** $(k,9)$ **;** **slope** $= \frac{3}{2}$

FINDING MISSING NUMBERS

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

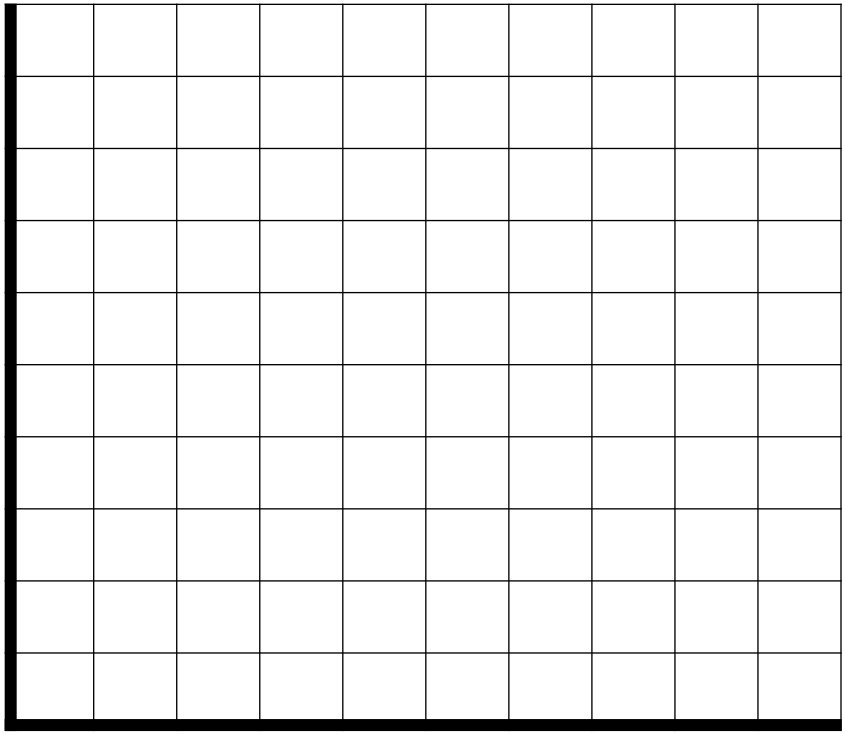
Find the value of k so that the line passes on the following point with the given slope.

8) $(8,1)$ ***and*** $(k,7)$ **;** **slope** $= -\frac{1}{2}$

Exploring

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

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



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 relation ship.

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.**

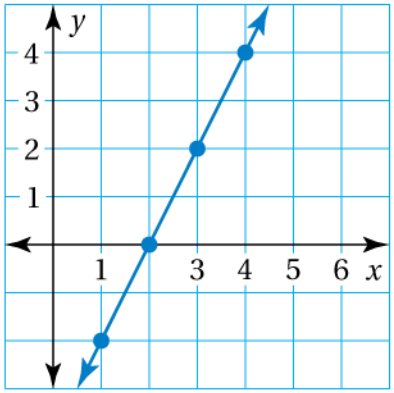
Examples

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

a.

x	1	2	3	4
y	-2	0	2	4

Plot the points. Draw a line through the points.

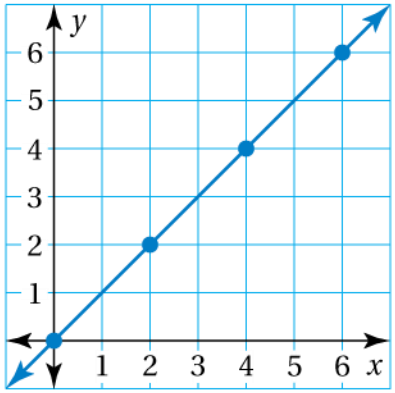


The line does *not* pass through the origin. So, x and y do *not* show direct variation.

b.

x	0	2	4	6
y	0	2	4	6

Plot the points. Draw a line through the points.

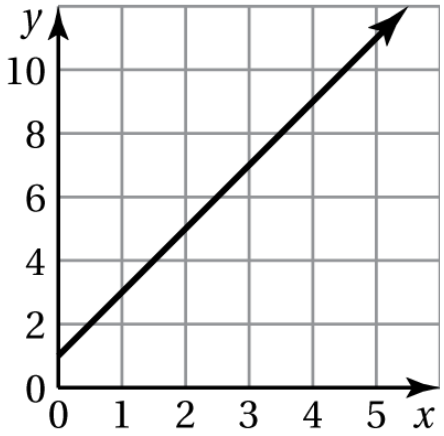


The line passes through the origin. So, x and y show direct variation.

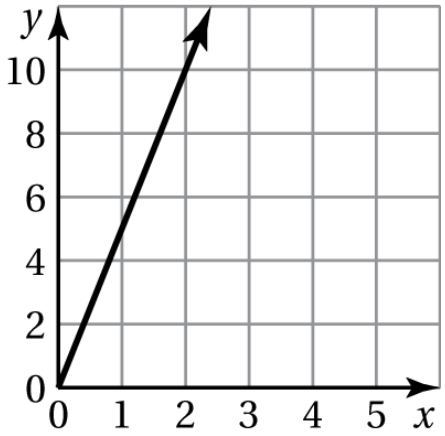
Practice

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

1)



2)



3)

x	1	3	6	8
y	3	6	8	11

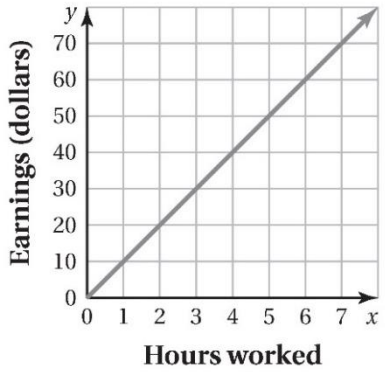
4)

x	4	8	12	16
y	2	4	6	8

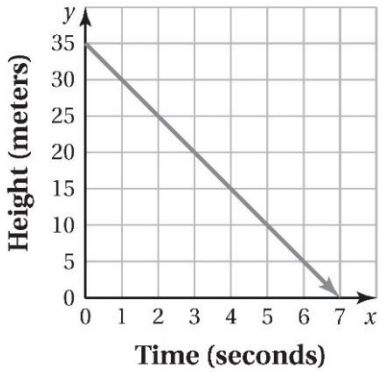
On Your Own

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

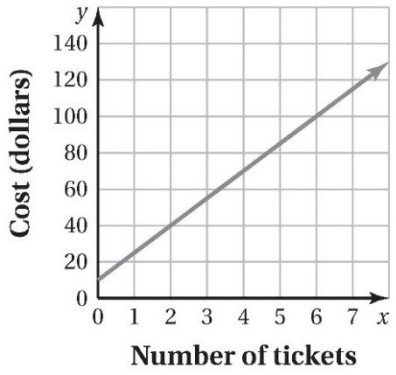
a. **Money**



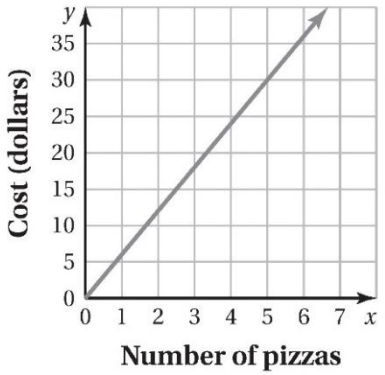
b. **Helicopter**



c. **Tickets**



d. **Pizzas**



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

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