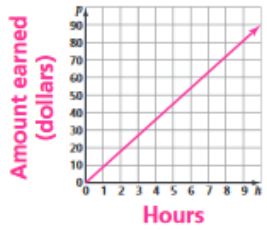
1. The amount p (in dollars) that you earn by working h hours is represented by the equation $p = 9h$. Graph the equation and interpret the slope.



p=9h

h	p
0	0
1	9
2	18

You get paid $9 per hour.

2. The cost c (in dollars) to rent a bicycle is proportional to the number h of hours that you rent the bicycle. It costs $20 to rent the bicycle for 4 hours.

a. Write an equation that represents the situation.

$C = 5h$

b. Interpret the slope.

It cost $5 an hour to rent a bicycle.

c. How much does it cost to rent the bicycle for 6 hours?

$30

y=mx

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

5=m

C=5(6)

4.3 Graphing Proportional Relationships

Goal Today's lesson is graphing proportional relationships.

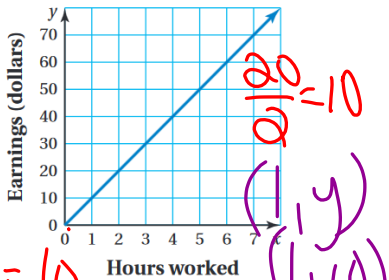
8.EE.5 8.EE.6

DO NOW Page 79 in your Journal.

1 ACTIVITY: Identifying Proportional Relationships

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

a. Money



$\frac{20}{2} = 10$

(1, y)

(1, 10)

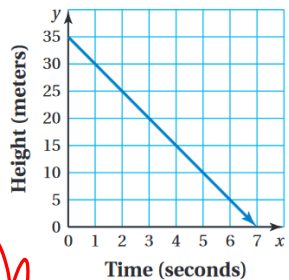
m = 10

yes

y = mx

y = 10x

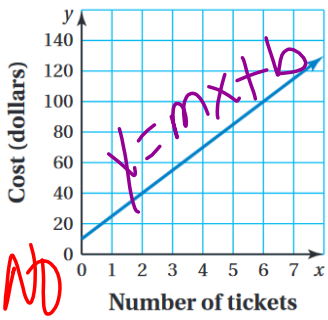
b. Helicopter



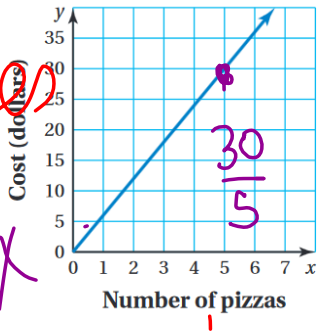
no

y = mx + b

c.



d.



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

2 ACTIVITY: Analyzing Proportional Relationships

Work with a partner. Use only the proportional relationships in Activity 1 to do the following.

- **Find the slope of the line.**
- **Find the value of y for the ordered pair $(1, y)$.**

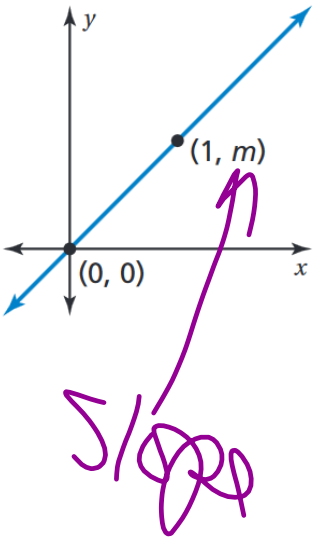
What do you notice? What does the value of y represent?

Key Idea

Direct Variation

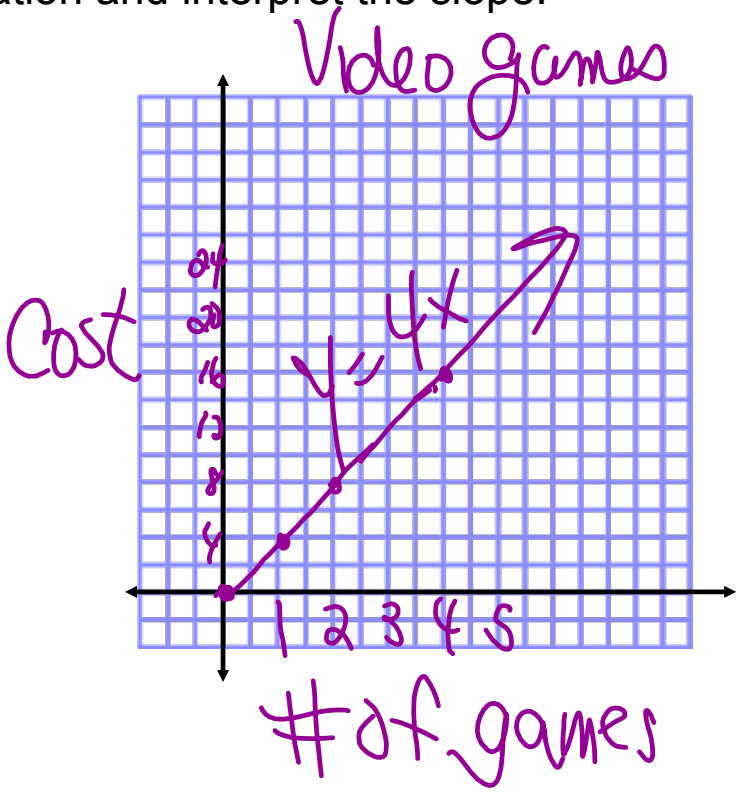
Words When two quantities x and y are proportional, the relationship can be represented by the direct variation equation $y = mx$, where m is the constant of proportionality.

Graph The graph of $y = mx$ is a line with a slope of m that passes through the origin.



The cost y (in dollars) to rent x video games is represented by y = 4x . Graph the equation and interpret the slope.

X	Y
0	0
1	4
2	8
3	12
4	16



The daily wage y (in dollars) of a factory worker is proportional to the number of parts x assembled in a day. A worker who assembles 250 parts in a day earns $75.

a. Write an equation that represents the situation.

$y = mx$

$75 = 250m$

$\frac{75}{250} = \frac{250m}{250}$

$m = 0.30$

$y = mx$

$y = 0.30x$

b. How much does a worker earn who assembles 300 parts in a day?

$y = 0.30x$

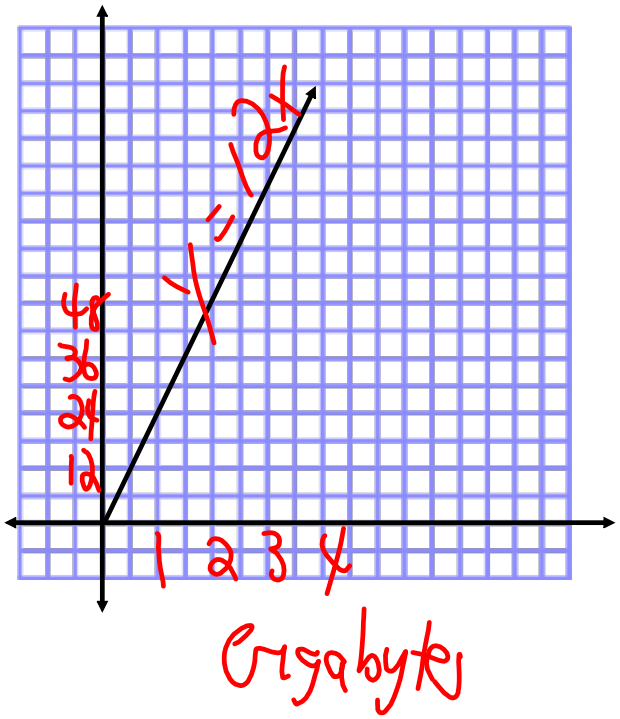
$y = 0.30(300)$

$y = \$90$

1. The cost y (in dollars) for x gigabytes of data on an Internet plan is represented by y = 12x. Graph the equation and interpret the slope.

$y = 12x$

x	y
0	0
1	12
2	24
3	36



2. The weight y of an object on Titan, one of Saturn's moons, is proportional to the weight x of the object on Earth. An object that weighs 105 pounds on Earth would weigh 15 pounds on Titan.

a. Write an equation that represents the situation.

$15 = 105m$ $\quad y = \frac{1}{7}x$

$\frac{1}{7} = m$

b. How much would a spacecraft that weighs 3500 kilograms on Earth weigh on Titan?

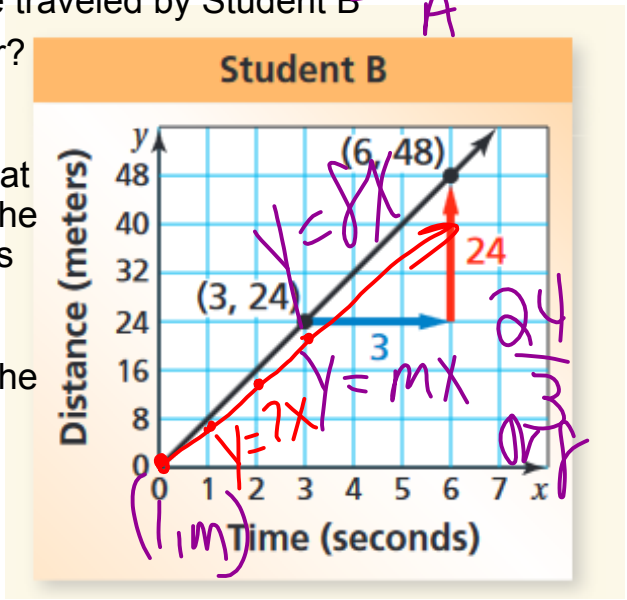
$y = \frac{1}{7}x \quad y = \frac{1}{7}(3500) \quad y = 500$ lb

At a track event, the distance y (in meters) traveled by Student A in x seconds is represented by the equation $y = 7x$. The graph shows the distance traveled by Student B

a. Which student is faster?

Student B

b. Graph the equation that represents Student A in the same coordinate plane as Student B. Compare the steepness of the graphs. What does this mean in the context of the problem?



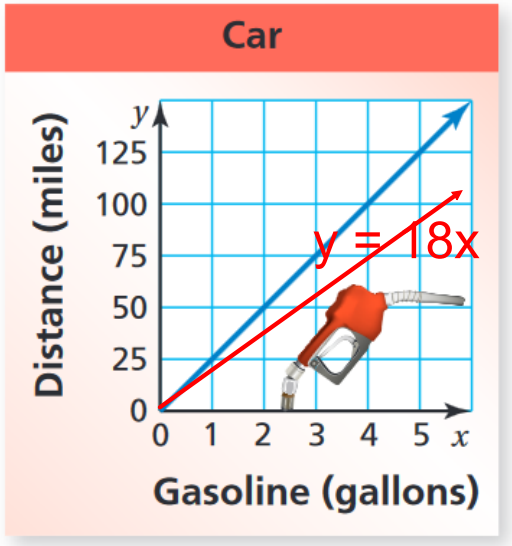
x	y
0	0
1	7
2	14
3	21

3. The distance y (in miles) that a truck travels on x gallons gasoline is represented by the equation y= 18x. The graph shows the distance that a car travels.

a.Which vehicle gets better gas mileage? Explain how you found your answer

The car get better gas mileage.

Steeper slope or higher m =25



b. How much farther can the vehicle you chose in part (a) travel than the other vehicle on 8 gallons of gasoline?

y = 18(8)
y = 144 mi

y = 25(8)
y = 200 mi

x	y
0	0
1	18
2	36
3	54
4	72