



Example



4. A 3-year-old dog is often considered to be 21 in human years. Assume that the equivalent age in human years y varies directly with its age as a dog x . Write and solve a direct variation equation to find the human-year age of a dog that is 6 years old.

Let x represent the dog's actual age and let y represent the human-equivalent age.

$$y = mx \quad \text{Direct variation}$$

$$21 = m(3) \quad y = 21, x = 3$$

$$7 = m \quad \text{Simplify.}$$

$$y = 7x \quad \text{Replace } m \text{ with } 7.$$

① $\frac{21}{3} = m = 7$

You want to know the human-year age or y -value when the dog is 6 years old.

$$y = 7x \quad \text{Write the equation.}$$

$$y = 7 \cdot 6 \quad x = 6$$

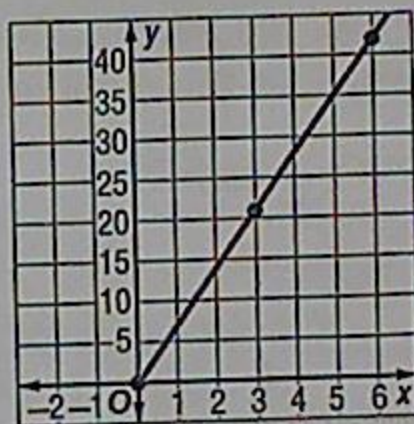
$$y = 42 \quad \text{Simplify.}$$

② $y = 7x$

$x = 6 \quad y = 7 \cdot 6 = 42$

So, when a dog is 6 years old, the equivalent age in human years is 42.

Check
Graph the equation $y = 7x$.
The y -value when $x = 6$ is 42. ✓



Got It? Do these problems to find out.

- d. A charter bus travels 210 miles in $3\frac{1}{2}$ hours. Assume the distance traveled is directly proportional to the time traveled. Write and solve a direct variation equation to find how far the bus will travel in 6 hours.

$y = 60 \cdot 6 = 360$

- e. A Monarch butterfly can fly 93 miles in 15 hours. Assume the distance traveled is directly proportional to the time traveled. Write and solve a direct variation equation to find how far the Monarch butterfly will travel in 24 hours.

$\frac{93}{15} = 6.2 \quad m = 6.2$
 $y = 6.2 \cdot 24 = 148.8$

$\frac{y}{x}$ can take



① Find the slope by dividing y by x
 $m = \frac{y}{x}$

② Put your m into $y = mx$

③ Solve the equation for the given value

$\frac{210}{3\frac{1}{2}} = m = 60$

Show your work.

d. $y = 60x; 360$ miles

e. $y = 6.2x; 148.8$ miles

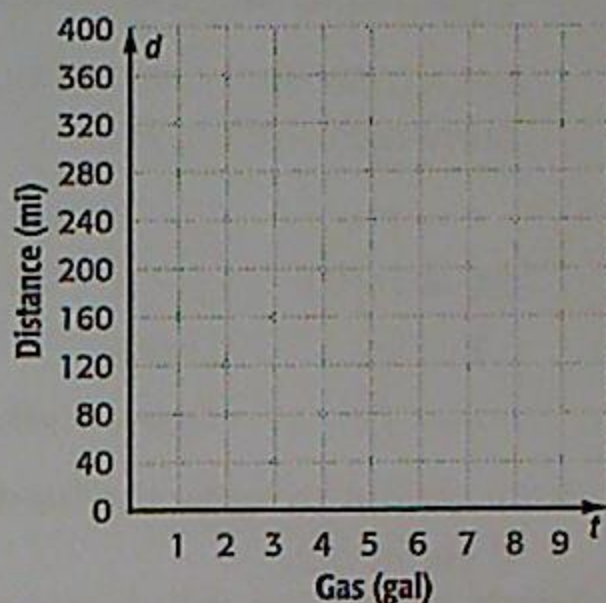
Guided Practice



1. A color printer can print 36 pages in 3 minutes and 108 pages in 9 minutes. If the number of pages varies directly with the time, at what rate is the color printer printing? (Example 1)

2. A new compact car can travel 288 miles on nine gallons of gas. The distance driven in miles y varies directly with the number of gallons of gas x . This situation can be represented by the equation $y = 32x$. (Examples 2 and 3)

- a. Graph the equation on the coordinate plane shown.
- b. How many miles per gallon does the car get?



c. The distance y traveled by a hybrid car using x gallons of gas can be represented by $y = 42x$. Which car gets better gas mileage? Explain.

3. **Financial Literacy** Annie's current earnings are shown in the table. She was offered a new job that will pay \$7.25 per hour. Assume that her earnings vary directly with the number of hours worked.

Hours, x	Money Earned (\$), y
2	13.00
3	19.50
4	26.00
5	32.50

Which job pays more an hour? (Example 3)

4. The height of a wide-screen television screen varies directly with its width. A television screen that is 60 centimeters wide and 33.75 centimeters high. Write and solve a direct variation equation to find the height of a television screen that is 90 centimeters wide.

(Example 4)

5. **Building on the Essential Question** What is the relationship among the unit rate, slope, and constant rate of change of a proportional linear relationship?

Rate Yourself!

How well do you understand direct variation? Circle the image that applies.



Clear



Somewhat Clear



Not So Clear

For more help, go online to access a Personal Tutor.

