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## Direct Variation

Unit 5 Lesson 2

# DIRECT VARIATION

## Students will be able to:

Understand the concept of direct variation and solve problems involving direct variations

## Key Vocabulary:

- Direct variation
- Direct variation equation
- Graph of a direct variation

## DIRECT VARIATION

### Direct Variation

A direct variation is a relationship between two quantities that can be represented by a function of the form:

$$y = kx$$

Where  $k \neq 0$ .

The value of  $k$  can be found as:

$$k = \frac{y}{x}$$

## DIRECT VARIATION

**Problem 1:** Does the equation  $5y = -3x$  represent a direct variation? If so, find the constant of variation.

## DIRECT VARIATION

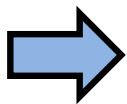
**Problem 1:** Does the equation  $5y = -3x$  represent a direct variation? If so, find the constant of variation.

Re-write the equation in the form of  $y = kx$ .

$$5y = -3x$$

$$y = -\frac{3}{5}x$$

The equation represents a direct variation. Compare with  $y = kx$ :

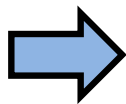


$$k = -\frac{3}{5}$$

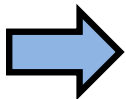
## DIRECT VARIATION

### Writing equation of a direct variation

If we are given any ordered pair  $(x_1, y_1)$  for a relationship that has a direct variation, we will find the constant of variation  **$k$**  and then write the equation.



$$k = \frac{y_1}{x_1}$$



$$y = kx$$



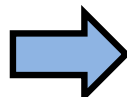
## DIRECT VARIATION

**Problem 2:** Suppose  $y$  varies directly with  $x$  and  $y = 21$  when  $x = 3$ . Write a direct variation equation relating  $x$  and  $y$ .

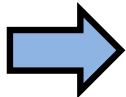
## DIRECT VARIATION

**Problem 2:** Suppose  $y$  varies directly with  $x$  and  $y = 21$  when  $x = 3$ . Write a direct variation equation relating  $x$  and  $y$ .

First find the constant of variation:


$$k = \frac{21}{3} = 7$$

Now write the equation:


$$y = kx \quad \Rightarrow \quad y = 7x$$

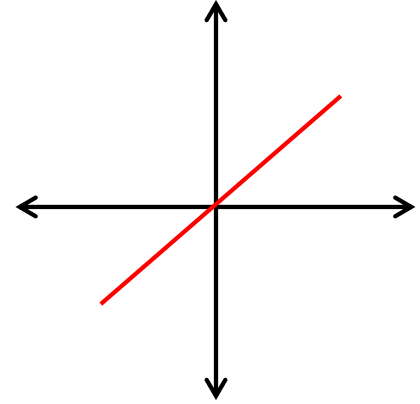


# DIRECT VARIATION

## Graphing a direct variation

The graph of a direct variation is a straight line that passes through the origin.

$$y = kx$$



$$y = kx$$