Algebra 1   3.4
Write and graph direct variation equations
Solve direct variation problems

y-intercept
slope m
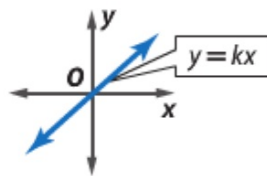direct variation
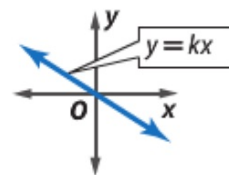constant of variation (proportionality) k
whiteboards

ConceptSummary **Direct Variation Graphs**

- Direct variation equations are of the form $y = kx$, where $k \neq 0$.

- The graph of $y = kx$ always passes through the origin.

- The slope is positive if $k > 0$.

$y = kx$
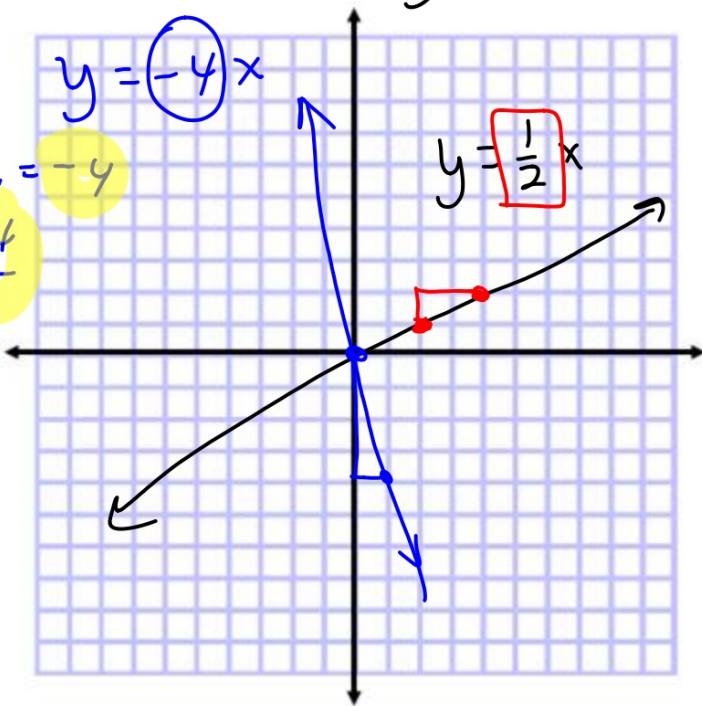
- The slope is negative if $k < 0$.

$y = kx$

$$y = (\quad) x$$

$y = \boxed{-4} x$

C.D.V. $= -4$

$m = \dfrac{-4}{1}$

$y = \boxed{\dfrac{1}{2}} x$

$\text{Cov} = \dfrac{1}{2}$

$m = \dfrac{1}{2}$

whiteboards

Suppose y varies directly as x. Write a direct variation equation that relates x and y. Then solve.

$(1.6, 3.2)$

30. If $y = 3.2$ when $x = 1.6$, find y when $x = 19$.

$y = k \cdot x$

$\dfrac{3.2}{1.6} = \dfrac{k \cdot 1.6}{1.6}$

$2 = k$

$y = 2x$

$y = 2 \cdot 19$

$y = 38$

31. If $y = 15$ when $x = \frac{3}{4}$, find x when $y = 25$.

$$y = kx \qquad \left(\frac{3}{4}, 15\right)$$

$$\frac{15}{\frac{3}{4}} = \frac{k \cdot \frac{3}{4}}{\frac{3}{4}}$$

$$20 = k$$

$$y = 20x$$

$$\frac{25}{20} = \frac{20 \cdot x}{20}$$

$$x = \frac{5}{4}$$

32. If $y = 4.5$ when $x = 2.5$, find y when $x = 12$.

$$y = 1.8x$$

$$\frac{4.5}{2.5} = \frac{K \cdot 2.5}{2.5}$$

$$1.8 = K$$

$$y = 1.8x$$

$$y = 1.8(12)$$

$$= 21.6$$

There are other kinds of variation:
      inverse
      joint
      combined

$$y = kx$$

If $y = 22$ when $x = 8$ $y = ?$ when $x = -16$

$$22 = k \cdot 8$$

$$y = 2.75x$$

$$2.75 = k$$

$$y = -44$$

$y = 4.25$ when $x = .75$

$\boxed{y = ? \quad x = 4.5}$

$4.25 = k \cdot (.75)$

$y = 5\frac{2}{3} x$

$\left(\underline{5\frac{2}{3} = k}\right)$

$\left(25.5\right)$

$\underline{\underline{5.7}} \quad y = 5.7 x$

$5.7 (4.5)$