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 relationship

whiteboards

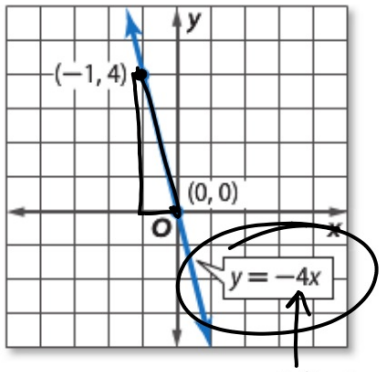
Quiz 3.3

COV comes from equation
Slope comes from ordered pairs

Example 1 Slope and Constant of Variation

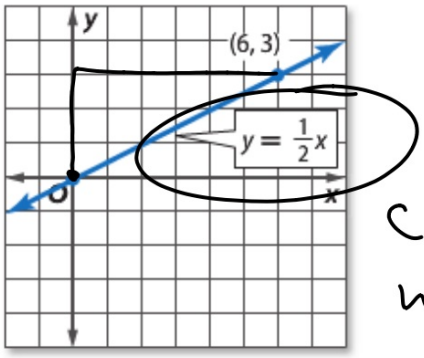
Name the constant of variation for each equation. Then find the slope of the line that passes through each pair of points.

a.



$\frac{-4}{1}$ COV $= -4$, $m = \frac{-4}{1}$

b.



COV $= \frac{1}{2}$

$m = \frac{3}{6} = \frac{1}{2}$

GuidedPractice

COV = $\frac{1}{4}$

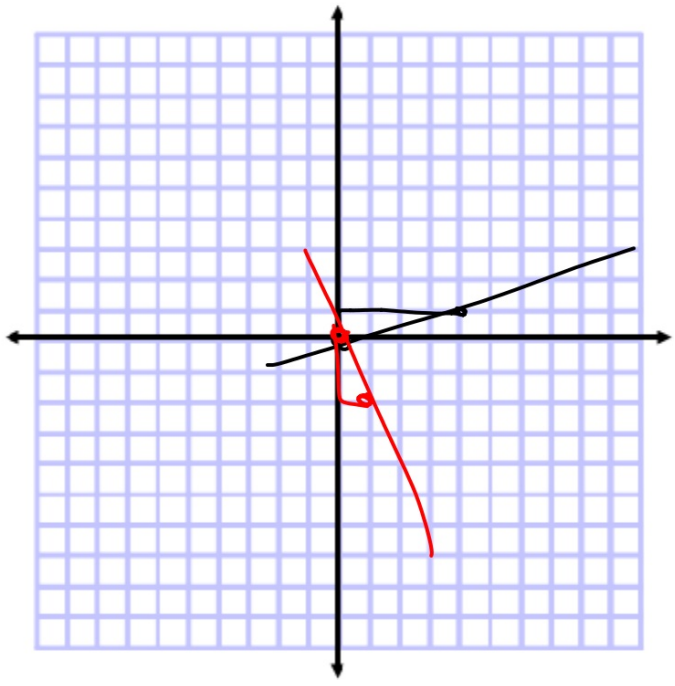
1A. Name the constant of variation for $y = \frac{1}{4}x$. Then find the slope of the line that passes through (0, 0) and (4, 1), two points on the line.

$m = \frac{1}{4}$

1B. Name the constant of variation for $y = -2x$. Then find the slope of the line that passes through (0, 0) and (1, −2), two points on the line.

COV = -2

$m = \frac{-2}{1}$



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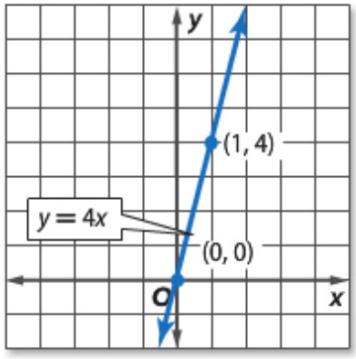
Name the constant of variation for each equation. Then find the slope of the line that passes through each pair of points.

10.



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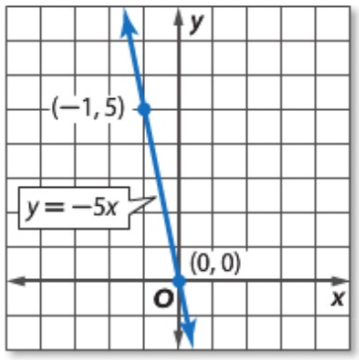
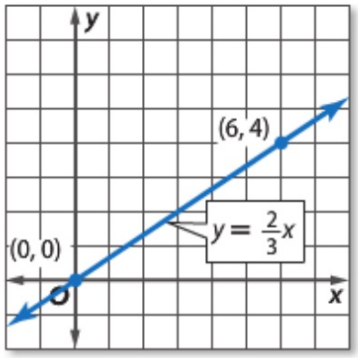
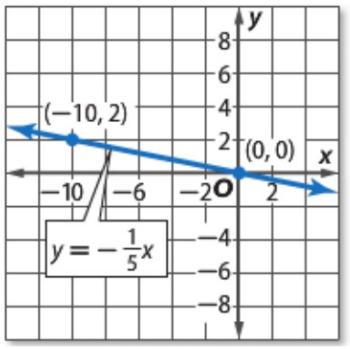


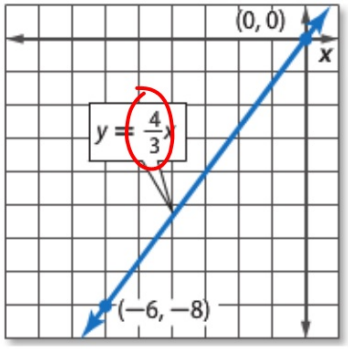
12.



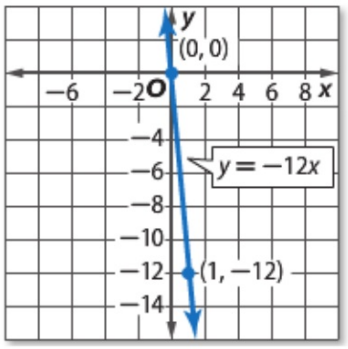
13.



14.



15.



$\text{Cov} = \frac{4}{3}$

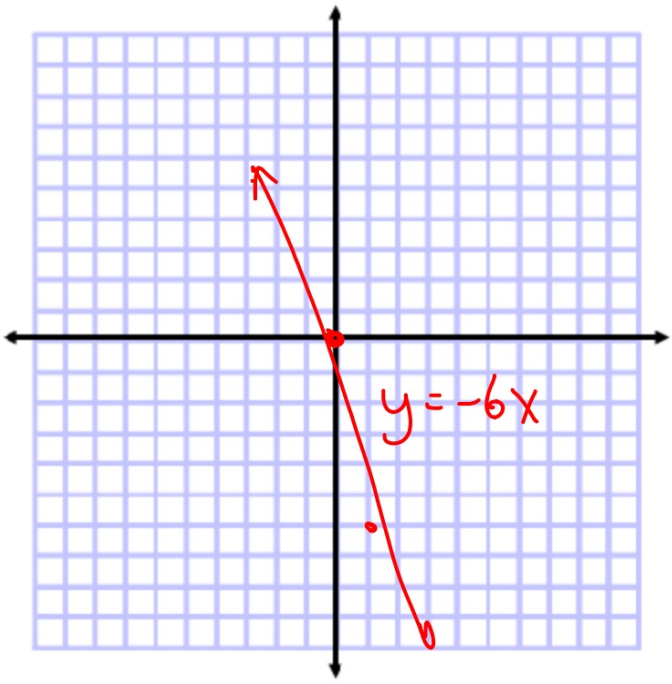
$m = \frac{4}{3} = 1\frac{1}{3}$

$y = (\quad) x$

Example 2 Graph a Direct Variation

Graph $y = -6x$.

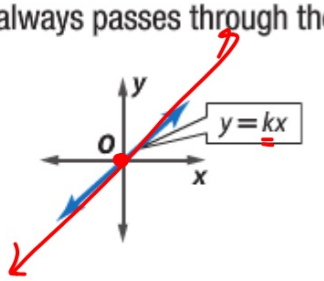
$y = -\frac{6}{1}x + 0$



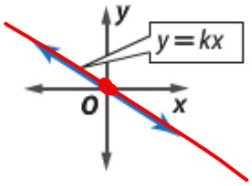
$y = mx + B$

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 $k > 0$.



- The slope is negative if $k < 0$.



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2A. $y = 6x + 0$

T

2B. $y = \frac{2}{3}x + 0$

2C. $y = -5x$ **2D.** $y = -\frac{3}{4}x$

Example 3 Write and Solve a Direct Variation Equation

Suppose y varies directly as x, and $y = 72$ when $x = 8$.

a. Write a direct variation equation that relates x and y.

$y = kx$

$\frac{72}{8} = \frac{k \cdot 8}{8}$

$(8, 72)$

$k = 9$

$y = 9x$

b. Use the direct variation equation to find x when $y = 63$.

$\frac{63}{9} = \frac{9x}{9}$

$x = 7$

1. ~~find~~ the constant
2. ~~write~~ the equation
3. ~~answer~~ the question

(don't be a doofus)

(14, 98)

3. Suppose y varies directly as x, and $y = 98$ when $x = 14$. Write a direct variation equation that relates x and y. Then find y when $x = -4$.

$y = kx$

$\frac{98}{14} = \frac{k \cdot 14}{14}$

$k = 7$

$y = 7x$

$y = 7 \cdot -4$

$y = -28$

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

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

$y = kx$

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

$k = 2$

$y = 2x$

$y = 2 \cdot 19$

$y = 38$

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

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

There are other kinds of variation:

- inverse
- joint
- (not today)

directly proportional

varies directly

$y = kx$

p. 185

11-37 odd

55-67 odd