

Equations to know...

Slope Formula:

$$\frac{y_2 - y_1}{x_2 - x_1}$$

(x_1, y_1)

(x_2, y_2)

Slope - Intercept Form:

$$y = mx + b$$

$m = \text{slope}$

$b = y - \text{intercept}$

method
1

Point - Slope Form:

$$y - y_1 = m(x - x_1)$$

$m = \text{slope}$

$(x_1, y_1) - \text{Point}$

method
2

PRACTICE

Find the equation that goes through the following two points. Write the equation in **slope - intercept form.**

1. $(-4, -1)$ $(8, 8)$

Slope: $\frac{8 - (-1)}{8 - (-4)} = \frac{9}{12} = \frac{3}{4}$

Pick one Point: $(8, 8)$

Equation:

$y = mx + b$
 $8 = \frac{3}{4}(8) + b$
 $8 = 6 + b$
 $2 = b$

$y = \frac{3}{4}x + 2$

3. $(2, -5)$ $(-3, 10)$

Slope: $\frac{10 - (-5)}{-3 - 2} = \frac{15}{-5} = -3$

Pick one Point: $(2, -5)$

Equation:

$y = mx + b$
 $-5 = -3(2) + b$
 $-5 = -6 + b$
 $1 = b$

$y = -3x + 1$

2. $(3, 0)$ $(-1, -8)$

Slope: $\frac{0 - (-8)}{3 - (-1)} = \frac{8}{4} = 2$

Pick one Point: $(3, 0)$

Equation:

$y = mx + b$
 $0 = 2(3) + b$
 $0 = 6 + b$
 $-6 = b$

$y = 2x - 6$

4. $(6, 9)$ $(-4, 4)$

Slope: $\frac{9 - 4}{6 - (-4)} = \frac{5}{10} = \frac{1}{2}$

Pick one Point: $(-4, 4)$

Equation:

$y = mx + b$
 $4 = \frac{1}{2}(-4) + b$
 $4 = -2 + b$
 $6 = b$

$y - 4 = \frac{1}{2}(x + 4)$
 $y - 4 = \frac{1}{2}x + 2$

$y = \frac{1}{2}x + 6$

or
 $9 = \frac{1}{2}(6) + b$
 $9 = 3 + b$
 $6 = b$

* Either point works

method 2

$y - 8 = \frac{3}{4}(x - 8)$

$y - 8 = \frac{3}{4}x - 6$

$y = \frac{3}{4}x + 2$

method 2

$y - 0 = 2(x - 3)$

$y = 2x - 6$

Given the following information, write the equation of the line in point-slope form.

5. slope = -4 point = (-8, 5)

Equation: $y - 5 = -4(x + 8)$

6. slope = $\frac{5}{4}$ point = (2, -4)

Equation: $y + 4 = \frac{5}{4}(x - 2)$

7. slope = 2 point = (4, 1)

Equation: $y - 1 = 2(x - 4)$

Find the equation that goes through the following two points. Write the equation in point-slope form.

14. (4, 7) and (5, 1)

Slope: $\frac{7-1}{4-5} = \frac{6}{-1} = -6$

Point: (4, 7)
or (5, 1)

Equation: $y - 7 = -6(x - 4)$
or $y - 1 = -6(x - 5)$

15. (9, -2) and (-3, 2)

Slope: $\frac{2 - (-2)}{-3 - 9} = \frac{4}{-12} = -\frac{1}{3}$

Point: (9, -2)
or (-3, 2)

Equation: $y + 2 = -\frac{1}{3}(x - 9)$
or $y - 2 = -\frac{1}{3}(x + 3)$

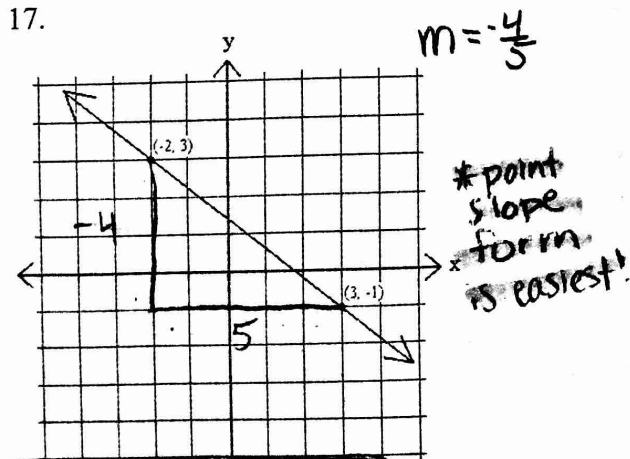
16. (3, -8) and (7, -2)

Slope: $\frac{-2 - (-8)}{7 - 3} = \frac{6}{4} = \frac{3}{2}$

Point: (3, -8)
or (7, -2)

Equation: $y + 8 = \frac{3}{2}(x - 3)$
or $y + 2 = \frac{3}{2}(x - 7)$

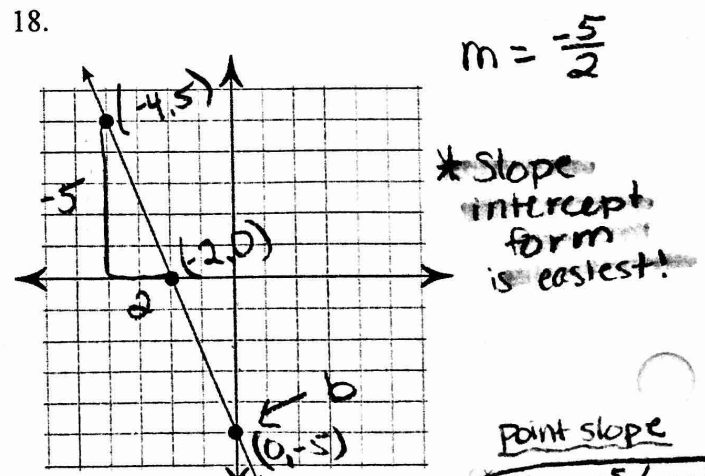
Write the equation for each of the graphs below.



Equation: $y - 3 = -\frac{4}{5}(x + 2)$
or $y + 1 = -\frac{4}{5}(x - 3)$

or Slope intercept $y = -\frac{4}{5}x + \frac{7}{5}$

18.



Point slope

Equation: $y - 5 = -\frac{5}{2}(x + 4)$
 $y = -\frac{5}{2}(x + 2)$
 $y + 5 = -\frac{5}{2}(x - 0)$

or Slope intercept $y = -\frac{5}{2}x - 5$