

Name:

Class:

Topic:

Date:

| Main Ideas/Questions   | Notes   |
|--|---|
| the<br>POINT-SLOPE<br>FORMULA  | Used to write the equation of a line when given a point $(x_1, y_1)$ and the slope of the line $(m)$  |
|  | Formula: $y - y_1 = m(x - x_1)$<br><br>*Be sure to distribute and solve for y!  |
| <b>EXAMPLES!</b><br><br>Find the equation of the line given the point and slope. | 1. $(4, 1)$ ; slope = 2<br>$y - 1 = 2(x - 4)$ $y - 1 = 2x - 8$ $\begin{array}{r} +1 \qquad +1 \\ \hline y = 2x - 7 \end{array}$   |
|  | 2. $(2, 4)$ ; slope = $\frac{1}{2}$<br>$y - 4 = \frac{1}{2}(x - 2)$ $y - 4 = \frac{1}{2}x - 1$ $\begin{array}{r} +4 \qquad +4 \\ \hline y = \frac{1}{2}x + 3 \end{array}$       |
|  | 3. $(-6, 0)$ ; slope = $\frac{2}{3}$<br>$y - 0 = \frac{2}{3}(x + 6)$ $y = \frac{2}{3}x + 4$   |
|  | 4. $(-8, -1)$ ; slope = $-\frac{3}{4}$<br>$y + 1 = -\frac{3}{4}(x + 8)$ $y + 1 = -\frac{3}{4}x - 6$ $\begin{array}{r} -1 \qquad -1 \\ \hline y = -\frac{3}{4}x - 7 \end{array}$ |
|  | 5. $(4, -3)$ ; slope = -1<br>$y + 3 = -1(x - 4)$ $y + 3 = -x + 4$ $\begin{array}{r} -3 \qquad -3 \\ \hline y = -x + 1 \end{array}$  |
|  | 6. $(0, -9)$ ; slope = 4<br>$y + 9 = 4(x - 0)$ $y + 9 = 4x$ $\begin{array}{r} -9 \qquad -9 \\ \hline y = 4x - 9 \end{array}$  |

What if you are given two points?

To write a linear equation given two points,  $(x_1, y_1)$  and  $(x_2, y_2)$ , follow this process:

Use the Slope Formula

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



Use the Point-Slope Formula

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

EXAMPLES!

Find the equation of the line given the two points.

7.  $(-3, 7)$  and  $(1, -1)$

$$m = \frac{-1 - 7}{1 + 3} = \frac{-8}{4} = -2$$

$$y - 7 = -2(x + 3)$$

$$y - 7 = -2x - 6$$

$$y = -2x + 1$$

8.  $(-6, -7)$  and  $(3, -4)$

$$m = \frac{-4 + 7}{3 + 6} = \frac{3}{9} = \frac{1}{3}$$

$$y + 7 = \frac{1}{3}(x + 6)$$

$$y + 7 = \frac{1}{3}x + 2$$

$$y = \frac{1}{3}x - 5$$

9.  $(2, -1)$  and  $(4, -6)$

$$m = \frac{-6 + 1}{4 - 2} = \frac{-5}{2}$$

$$y + 1 = -\frac{5}{2}(x - 2)$$

$$y + 1 = -\frac{5}{2}x + 5$$

$$y = -\frac{5}{2}x + 4$$

10.  $(-3, -8)$  and  $(2, 7)$

$$m = \frac{7 + 8}{2 + 3} = \frac{15}{5} = 3$$

$$y + 8 = 3(x + 3)$$

$$y + 8 = 3x + 9$$

$$y = 3x + 1$$

11.  $(-6, -3)$  and  $(-4, -1)$

$$m = \frac{-1 + 3}{-4 + 6} = \frac{2}{2} = 1$$

$$y + 3 = 1(x + 6)$$

$$y + 3 = x + 6$$

$$y = x + 3$$

12.  $(-4, 7)$  and  $(6, 2)$

$$m = \frac{2 - 7}{6 + 4} = \frac{-5}{10} = -\frac{1}{2}$$

$$y - 7 = -\frac{1}{2}(x + 4)$$

$$y - 7 = -\frac{1}{2}x - 2$$

$$y = -\frac{1}{2}x + 5$$