

Name:		Date:
Topic/Objective: Writing an equation given two points 4.2		Class/Period:
Questions/Main Ideas:	Notes:	
Key Vocabulary: y-intercept slope slope-intercept form	y - Intercept: When the line crosses the y axis Slope: Steepness of a line Slope-Intercept: An equation that has the slope and y-intercept	
Let's do a Warm up! $y = mx + b$	Write an equation of the line with the given slope of -4 and y-intercept of 1 $y = mx + b$ $m = -4$ $b = 1$ $y = -4x + 1$	
What do both problems have in common?	Write an equation of the line shown: $(2, -1)$, $(0, 4)$ $m = \frac{4 - (-1)}{0 - 2} = \frac{5}{-2}$ $m = 5/-2$ $b = 4$ $y = \frac{5}{-2}x + 4$	
QUESTION????? How do you find the equation given two lines?	EXAMPLE 1: Write an equation of the line that passes through the point $(-1, 3)$ and has a slope of -4 . m x y	
Steps to write an equation given two points:	Step 1: $m = -4$	
Step 1: Identify the slope	Step 2: find b $y = mx + b$ $x = -1$ $y = 3$ $m = -4$ $3 = -4(-1) + b$ $3 = 4 + b$ $-4 \quad -4$ $1 = b$	
Step 2: Find the y-intercept	Step 3: $y = -4x + 1$	
Step 3: Write an equation of the line		
Guided practice: $y = 2x - 9$	Write an equation of the line that passes through the points $(6, 3)$ and has a slope of 2. $m = 2$ $y = mx + b$ $x = 6$ $3 = 2(6) + b$ $y = 3$ $3 = 12 + b$ $b = ?$ $-12 \quad -12$ $-9 = b$ $y = 2x - 9$	

Question?????

How is example 2 different from example 1?

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

EXAMPLE 2:
Write an equation of the line that passes through $(-2, 5)$ and $(2, -1)$

x_1, y_1 x_2, y_2

Step 1: Find the slope

$$m = \frac{-1 - 5}{2 - (-2)} = \frac{-1 - 5}{2 + 2} = \frac{-6}{4} = \frac{-3}{2} = m$$

Step 2: Find the y-intercept

$$y = mx + b$$

$$-1 = -\frac{3}{2} \left(\frac{2}{1}\right) + b$$

Step 3: Write an equation

$$y = mx + b$$

$$-1 = -3 + b$$

$$\frac{+3}{+3}$$

$$\boxed{a = b}$$

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

Guided Practice:

$$y = -1x - 1$$

$$y = 1x - 3$$

Write an equation of the line that passes through $(1, -2)$ and $(-5, 4)$

x_1, y_1 x_2, y_2

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

$b = ?$ $y = mx + b$

$$x = 1$$

$$y = -2$$

$$m = -1$$

$$-2 = -1(1) + b$$

$$-2 = -1 + b$$

$$\frac{+1}{+1}$$

$$\boxed{-1 = b}$$

$$y = -1x - 1$$

ON YOUR OWN!!!

1.) $(1, 1)$; $m = 3$

$$x = 1$$

$$y = 1$$

$$m = 3$$

$$b = ?$$

$$1 = 3(1) + b$$

$$1 = 3 + b$$

$$\frac{-3}{-3}$$

$$\boxed{-2 = b}$$

$$y = 3x - 2$$

2.) $(5, 1)$ $m = 2$

$$x = 5$$

$$y = 1$$

$$m = 2$$

$$b = ?$$

$$1 = 2(5) + b$$

$$1 = 10 + b$$

$$\frac{-10}{-10}$$

$$\boxed{-9 = b}$$

$$y = 2x - 9$$

3.) $(8, -4)$ $m = -\frac{3}{4}$

$$x = 8$$

$$y = -4$$

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

$$b = ?$$

$$-4 = -\frac{3}{4} \left(\frac{8}{1}\right) + b$$

$$-4 = -\frac{24}{4} + b$$

$$-4 = -6 + b$$

$$\frac{+6}{+6}$$

$$\boxed{2 = b}$$

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

$$y = 3x + 1$$

$$4.) \begin{matrix} (1,4) & (2,7) \\ x_1, y_1 & x_2, y_2 \end{matrix}$$

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

$$\begin{matrix} b = ? \\ x = 1 \\ y = 4 \\ m = 3 \end{matrix}$$

plug
in

$$y = mx + b$$

$$4 = 3(1) + b$$

$$4 = 3 + b$$

$$\begin{array}{r} -3 \quad -3 \\ \hline 1 = b \end{array}$$

$$y = 3x + 1$$

$$5.) \begin{matrix} (3,2) & (4,9) \\ x_1, y_1 & x_2, y_2 \end{matrix}$$

$$m = \frac{9-2}{4-3} = \frac{7}{1} = 7$$

$$\begin{matrix} y = 2 \\ x = 3 \\ m = 7 \\ b = ? \end{matrix}$$

$$y = mx + b$$

$$2 = 7(3) + b$$

$$2 = 21 + b$$

$$\begin{array}{r} -21 \quad -21 \\ \hline -19 = b \end{array}$$

$$-19 = b$$

$$\begin{matrix} y = mx + b \\ y = 7x - 19 \end{matrix}$$

$$6.) \begin{matrix} (10,-5) & (-5,1) \\ x_1, y_1 & x_2, y_2 \end{matrix}$$

$$m = \frac{1 - (-5)}{-5 - 10} = \frac{6}{-15} = -\frac{2}{5}$$

$$\begin{matrix} y = 1 \\ x = -5 \\ m = -\frac{2}{5} \\ b = ? \end{matrix}$$

$$y = mx + b$$

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

$$1 = \frac{-10}{-5} + b$$

$$\begin{array}{r} -1 \quad -1 \\ \hline -1 = b \end{array}$$

$$-1 = b$$

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