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| Name: | | Date: |
| Topic/Objective: | | Class/Period: |
| How do you write linear equations in point slope form? | | |
| Questions/Main Ideas: | Notes: | |
| <p>DO NOW: Write an equation of the line:</p> <p>1.) passes through (3,4) $m=3$</p> <p>2.) passes through (-2,2) and (1,8)</p> <p>x_1, y_1 x_2, y_2 *</p> | <p>$m=3$ $y=mx+b$ $b=?$ $4=3(3)+b$ $x=3$ $4=9+b$ $y=4$ $\frac{-9-9}{-5=b}$ $y=3x-5$</p> <p>$m=\frac{8-2}{1-(-2)}=\frac{6}{3}=2$ $y=mx+b$ $2=2(-2)+b$ $2=-4+b$ $\frac{+4+4}{6=b}$ $y=2x+6$</p> <p>$m=2$ $x=-2$ $y=2$ $b=?$</p> | |
| Warm up: | <p>Slope: $m=\frac{y_2-y_1}{x_2-x_1}$</p> <p>Slope intercept form: $y=mx+b$</p> | |
| Vocabulary: | <p>Point slope form: has a point and a slope</p> <p>$y - y_1 = m(x - x_1)$</p> | |
| EXAMPLE 1: Write an equation in point slope form | <p>EXAMPLE 1: Write an equation in point slope form of the line that passes through the point (4,-3) and has a slope of 2.</p> <p>x_1, y_1 $y - y_1 = m(x - x_1)$ $y - (-3) = 2(x - 4)$ $y + 3 = 2(x - 4)$</p> <p>$y + 3 = 2x - 8$ $\frac{-3}{-3} \quad \frac{-8}{-3}$ $y = 2x - 11$</p> | |
| Guided Practice: $y=mx+b$ | <p>Write an equation in point slope form of the line that passes through the point (-1, 4) and has a slope of -2.</p> <p>x_1, y_1 $y - y_1 = m(x - x_1)$ $y - 4 = -2(x - (-1))$ $y - 4 = -2(x + 1)$</p> <p>$y - 4 = -2x - 2$ $\frac{+4}{+4} \quad \frac{-2}{+4}$ $y = -2x + 2$</p> | |

EXAMPLE 2: Write the equation in point slope form

Example 2:

Write an equation in point slope form of a line that passes through the points (2,3) and (4,4)

$$x_1, y_1 \quad x_2, y_2$$

Step 1: Find the Slope

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 3}{4 - 2} = \frac{1}{2} = m$$

Step 2: Write the equation in point slope form

(2,3)
Choose any point
 $y - y_1 = m(x - x_1)$

$$y - 3 = \frac{1}{2}(x - 2)$$

$$\begin{array}{r} y - 3 = \frac{1}{2}x - 1 \\ +3 \qquad +3 \\ \hline y = \frac{1}{2}x + 2 \end{array}$$

(4,4)

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

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

$$\begin{array}{r} +4 \qquad +4 \\ \hline y = \frac{1}{2}x + 2 \quad \checkmark \end{array}$$

Guided Practice

Write the equation in point slope form: $(7,2)$ $(2,12)$

$$m = \frac{12 - 2}{2 - 7} = \frac{10}{-5} = -2$$

(7,2)
 $x \quad y$
 $y - y_1 = m(x - x_1)$

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

$$\begin{array}{r} y - 2 = -2x + 14 \\ +2 \qquad +2 \\ \hline y = -2x + 16 \end{array}$$

x_1, y_1
(2,12)

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

$$y - 12 = -2(x - 2)$$

$$y - 12 = -2x + 4$$

$$\begin{array}{r} +12 \qquad +12 \\ \hline y = -2x + 16 \end{array}$$

Example 3:
Graphing in point slope form

Is the equation already in point slope form?

Example 3

Graph the equation

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

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

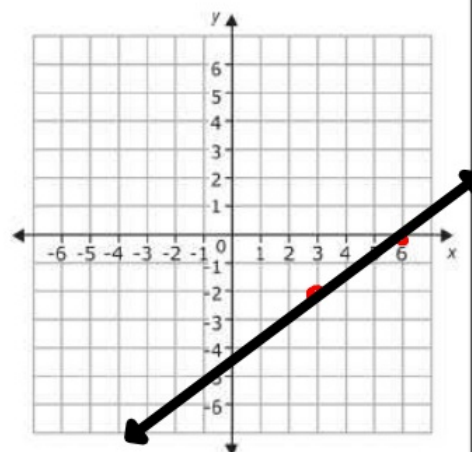
Step 1: Find the slope

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

Step 2: Find a point:

$$(3, -2)$$

Step 3: Draw a line



Guided practice

$$y = -x - 3$$

$$-\frac{1}{1}$$

Graph the equation: $y - 1 = -(x + 4)$

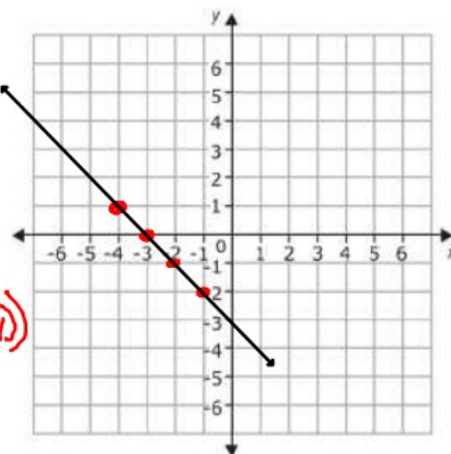
$$y - y_1 = m(x - x_1)$$

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

$$(-4, 1)$$

$$y - 1 = -1(x - (-4))$$

$$y - 1 = -(x + 4)$$



Summary:

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

$$(-4, 2)$$

