DO NOW

Write the equation of a line that has a slope of -2 and a *y*-intercept of 7.

$y = mx + b$

$y = -2x + 7$

Page 1

3.4 Writing An Equation Given Slope and a Point

Slope Intercept Form: $y = mx + b$ STARTER OR FINISHER

GIVEN: $m \rightarrow$ slope, $b \rightarrow$ y-intercept

Point Slope Form: $y - y_1 = m(x - x_1)$ STARTER

DO NOT replace x or y.

DO replace m and (x_1, y_1)

GIVEN: $m \rightarrow$ slope, $(x_1, y_1) \rightarrow$ point

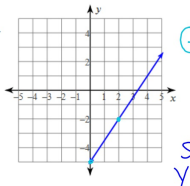
Standard Form: $Ax + By = C$ FINISHER

- ★ DO NOT substitute into this form
- ★ Tells what the answer needs to look like
- ★ A CANNOT be negative
- ★ NO FRACTIONS

Page 2

Examples: Write the equation of the line in slope intercept form.

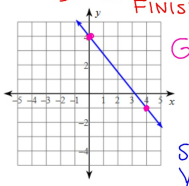
FINISH as $y = mx + b$

1. 

Given: $m = \frac{3}{2}$, $b = -5$

Starter: $y = mx + b$

$y = \frac{3}{2}x - 5$

2. 

Given: $m = -\frac{5}{4}$, $b = 4$

Starter: $y = mx + b$

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

3. Slope = 3; *y*-intercept = -2

Given: m, b

Starter: $y = mx + b$

$y = 3x - 2$

4. P(0, 6) and slope = $\frac{2}{3}$

Given: b, m

Starter: $y = mx + b$

$y = \frac{2}{3}x + 6$

Page 3

5. P(1, -4) and slope = 0

Given: Point (x_1, y_1), m

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

$y - -4 = 0(x - 1)$

$y + 4 = 0$

$y = 0 - 4$

$y = -4$

slope

6. P(-4, 1) and slope = 3

Given: x_1, y_1, m

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

$y - 1 = 3(x - -4)$

$y - 1 = 3(x + 4)$

$y - 1 = 3x + 12$

$y = 3x + 12 + 1$

$y = 3x + 13$

7. parallel to $2y - 3x = 6$ and has a *y*-intercept of -1

Given: $2y = 3x + 6$

$\frac{2y}{2} = \frac{3x + 6}{2}$

$y = \frac{3x}{2} + \frac{6}{2}$

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

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

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

b

Starter: $y = mx + b$

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

Page 4

8. perpendicular to $y = 3x - 2$ and passes through (3, 5).

slope $m = 3$

$\perp m = -\frac{1}{3}$

x_1, y_1

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

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

$y - 5 = -\frac{1}{3}(x) - \frac{1}{3}\left(\frac{-3}{1}\right)$

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

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

$y = -\frac{1}{3}x + 6$

Page 5

Examples: Write the equation of the line in standard form.

9. P(2, 3) and $m = 5$

FINISH $\rightarrow Ax + By = C$

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

$y - 3 = 5(x - 2)$

$y - 3 = 5x - 10$

$y = 5x - 10 + 3$

$y = 5x - 7$

$-5x + y = -7$

A can't be negative

Change all signs

$5x - y = 7$

looks like this

Page 6

10. perpendicular to $y = 4x + 1$ and passes through (2, 3)

slope

$m = 4$

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

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

$y - 3 = -\frac{1}{4}(x - 2)$

$y - 3 = -\frac{1}{4}(x) - \frac{1}{4}\left(\frac{-2}{1}\right)$

$y - 3 = -\frac{1}{4}x + \frac{1}{2}$ ← Can't have fractions

Multiply by LCD = 4

$4(y - 3) = 4\left(-\frac{1}{4}x + \frac{1}{2}\right)$

$4y - 12 = 4\left(-\frac{1}{4}x\right) + 4\left(\frac{1}{2}\right)$

$4y - 12 = -x + 2$

$4y = -x + 2 + 12$

$4y = -x + 14$

$x + 4y = 14$

HOMEWORK

Worksheet - HW 3.4 Writing Equations Given Slope and a Point