

U6D5_T Equation Given Slope and a Point

Friday, April 20, 2018 9:04 AM



U6D5_T
Equation ...

Warm Up: Determine the equation of a line that is:

a) parallel to $3x - 8y - 48 = 0$

$$-8y = -3x + 48$$

$$m_{\parallel} = \frac{3}{8}$$

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

$$m = \frac{3}{8}$$

$$\therefore y = \frac{3}{8}x - 137 \text{ is } \parallel$$

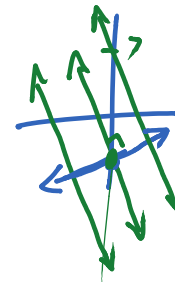
any
 $b \neq -6$

b) perpendicular to $3x - 8y - 48 = 0$

$$m_{\perp} = -\frac{8}{3}$$

any number for b

$$\therefore y = -\frac{8}{3}x + 7 \text{ is } \perp$$



U6D5 Finding Equation of a Line (Given the Slope and One Point)

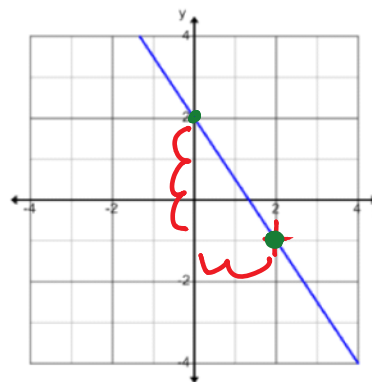
Recall:

Finding the equation of a line from the graph.

$$b = 2 \quad m = -\frac{3}{2}$$

$$y = mx + b$$

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



*Notice: the point (2, -1) is on the line.

Example 1: Determine the equation of a line passing through the point (4,5) with a slope of -2.

$$y = mx + b$$

sub in $x=4, y=5, m=-2$
solve for b.

$$mx + b = y$$

$$-2(4) + b = 5$$

$$-8 + b = 5$$

$$b = 5 + 8$$

$$b = 13$$

$$\therefore y = -2x + 13$$

Example 2:

Determine the equation of a line that has a slope of $\frac{5}{6}$ and passes through the point (10,-4).

$$mx + b = y$$

$$\frac{5}{6}(10) + b = -4$$

$$\frac{25}{3} + b = -\frac{4}{1}$$

subtract $\frac{25}{3}$ from both sides.

$$b = -\frac{12}{3} - \frac{25}{3}$$

$$b = -\frac{37}{3}$$

$$\therefore y = \frac{5}{6}x - \frac{37}{3}$$

Example 3: Find the equation of a line..

a) parallel to $y = -\frac{1}{4}x - 6$, passing through $(3, 1)$

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

$$m_{\parallel} = -\frac{1}{4} \quad \begin{matrix} x & y \\ (3, & 1) \end{matrix}$$

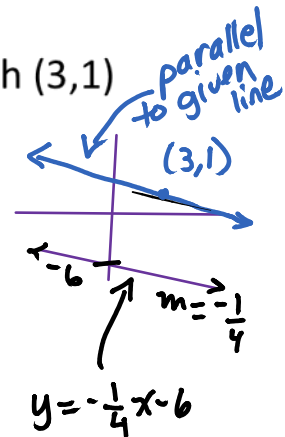
$$mx + b = y$$

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

$$-\frac{3}{4} + b = \frac{1}{1} \quad \text{LCD 4}$$

$$b = \frac{4}{4} + \frac{3}{4} = \frac{7}{4}$$

$$\therefore \boxed{y = -\frac{1}{4}x + \frac{7}{4}}$$



b) perpendicular to $y = \frac{1}{3}x - 20$, and passing through $(3, -7)$.

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

$$m_{\perp} = -3$$

$$mx + b = y$$

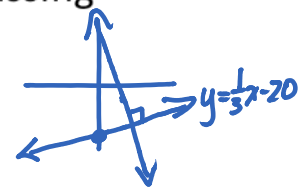
$$-3(3) + b = -7$$

$$-9 + b = -7$$

$$b = -7 + 9$$

$$b = 2$$

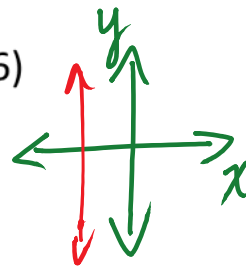
$$\therefore \boxed{y = -3x + 2}$$



c) parallel to the y-axis, passing through $(-3, -6)$

cuts through x-axis

so, equation of line is $x = a$ ← x-int.



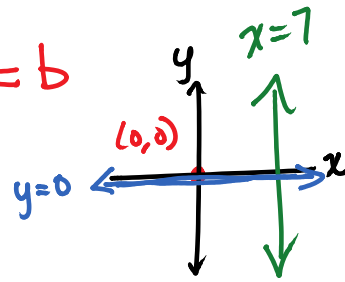
$$x = -3$$

d) perpendicular to $x = 7$, passing through the origin.

$(0, 0)$
x y

cuts through x-axis
cuts through y-axis

↳ $y = b$



$$y = 0$$