# INTERMEDIATE ALGEBRA

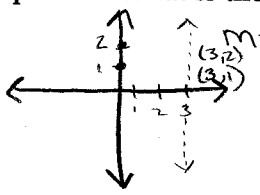
**GPS # 9** **2.4 EQUATIONS OF LINES AND LINEAR MODELS** **NAME:** Kelly Fenton

**Useful Guidelines:**

* The slope-intercept form of the equation of a line with slope $m$ and $y$-intercept $b$ is $y = mx + b$ (slope, y int.)
* The point-slope form of the equation of a line with slope $m$ passing through the point $(x_1, y_1)$ is $y - y_1 = m(x - x_1)$
* The standard form of the equation of a line: $ax + by = c$
* Two lines with the same slope are parallel: $m_1 = m_2$
* Two lines with nonzero slopes $m_1$ and $m_2$ are perpendicular when $m_1 \cdot m_2 = -1$ or $m_2 = -\frac{1}{m_1}$.

1. Graph the equation. What is the slope?

a) $x = 3$

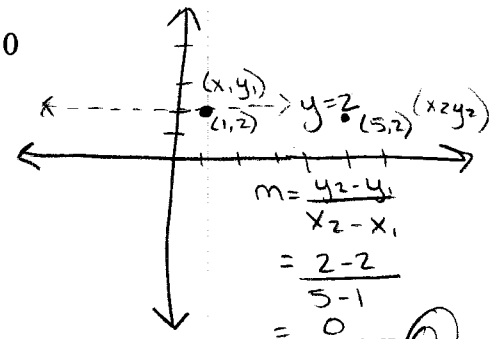



m = undefined

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2-1}{3-3} = \frac{1}{0}$ undef.

b) $y - 2 = 0$

$y = 2$




$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2-2}{5-1} = \frac{0}{4} = 0$

2. Does the point (2,48) lie on the line $y = 20x + 8$?

Plug in

$48 = 20(2) + 8 = 48$ yes

3. Using the point-slope form to find an equation of the line that satisfies the given conditions. Write the equation in slope-intercept form and in standard form.

a) Through (6, 1); slope $-\frac{1}{3}$ $(x_1, y_1)$ $m = -\frac{1}{3}$ $y - y_1 = m(x - x_1)$

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

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

$y = -\frac{1}{3}x + 3$ (slope int. form)

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

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

$3y + x = 9$ (standard form)

b) Through (-3,-2); slope $-\frac{4}{3}$ $x_1, y_1$ $m = -\frac{4}{3}$

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

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

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

$y = -\frac{4}{3}x - 6$ (slope int. form)

$y + \frac{4}{3}x = -6$

$3(y + \frac{4}{3}x) = -6(3)$

$3y + 4x = -18$ (standard form)

3. Find an equation of the line passing through the point (-2, 4) $x_1, y_1$ and

a) parallel to the line $3x + 5y = 10$

[Write each equation in slope-intercept form.]

Solve for y

$\frac{5y}{5} = \frac{-3x}{5} + \frac{10}{5}$

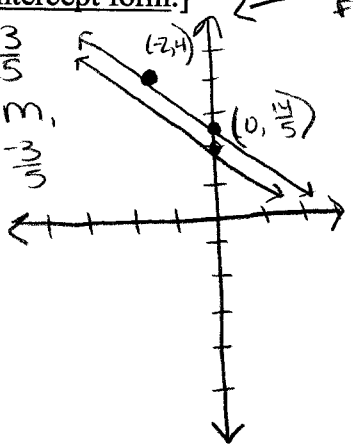
$y = -\frac{3}{5}x + 2$ slope

1 point 1 slope

$m_1 = -\frac{3}{5}$

$m_2 = m_1$

$m_2 = -\frac{3}{5}$




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

$y - 4 = -\frac{3}{5}(x + 2)$

$y - 4 = -\frac{3}{5}x - \frac{6}{5}$

$y = -\frac{3}{5}x - \frac{6}{5} + 4 \cdot \frac{5}{5} = \frac{20}{5}$

$y = -\frac{3}{5}x + \frac{14}{5}$ slope int. form

b) perpendicular to the line $3x + 5y = 10$

Flip $m_2 = \frac{5}{3}$

$(x_1, y_1) = (-2, 4)$

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

$y - 4 = \frac{5}{3}(x + 2)$

$y - 4 = \frac{5}{3}x + \frac{10}{3}$

$y = \frac{5}{3}x + \frac{10}{3} + 4 \cdot \frac{3}{3}$

$y = \frac{5}{3}x + \frac{10}{3} + \frac{12}{3}$

$y = \frac{5}{3}x + \frac{22}{3}$ slope int. form