

Writing Linear Equations

Important Formulas:

Slope Intercept $y = \overset{\text{slope}}{m}x + \underset{\text{y-intercept (starting point)}}{b}$

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

Standard Form $ax + by = c$ a is never negative
no fractions

Slope (m) $m = \frac{y_2 - y_1}{x_2 - x_1}$ (x_1, y_1) (x_2, y_2)

Parallel-SAME SLOPE perpendicular-Opposite Reciprocal
ex. $y = 2x - 4$ \parallel slope = 2
ex. $y = \frac{2}{3}x - 4$ \perp slope = $-\frac{1}{2}$

Given the y intercept and slope

$b = 6$ $m = 12$

$$y = 12x + 6$$

Given a point and the slope

$(5, 3)$ $m = -4/3$ $m = -4/3$

$y - y_1 = m(x - x_1)$ $x_1 = 5$

$y - 3 = -\frac{4}{3}(x - 5)$ $y_1 = 3$

$y - 3 = -\frac{4}{3}x + \frac{20}{3}$ $\text{dec} \rightarrow \text{frac}$
 $+3$ math enter
 $y = -\frac{4}{3}x + \frac{29}{3}$ enter

Given two points (x_1, y_1) (x_2, y_2) $y = mx + b$

$(18, 3)$ $(5, 13)$ $m = \frac{y_2 - y_1}{x_2 - x_1}$

$m = \frac{13 - 3}{5 - 18} = \frac{10}{-13}$

$m = -\frac{10}{13}$ $x_1 = 18$
 $y_1 = 3$

$y - 3 = -\frac{10}{13}(x - 18)$

$y - 3 = -\frac{10}{13}x + \frac{180}{13}$

$$y = -\frac{10}{13}x + \frac{219}{13}$$

Given a point and Parallel or Perpendicular Line

$(-5, 9)$ \parallel $y = 4x - 2$
 $\parallel = 4$

$m = 4$

$x_1 = -5$

$y_1 = 9$

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

$y - 9 = 4(x - (-5))$

$y - 9 = 4x + 20$
 $+9$ $+9$

$y = 4x - 2$

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

$x_1 = 5$

$y_1 = 9$

$y - 9 = -\frac{1}{4}(x + 5)$

$y - 9 = -\frac{1}{4}x - \frac{5}{4}$
 $+9$ $+9$

$$y = -\frac{1}{4}x + \frac{31}{4}$$

Written in Standard Form

$4x - 4y = 5$ (1) subtract x
 $-4x$ $-4x$ (2) divide everything by # w/ y
 $-1y = -4x + 5$
 -1 -1 -1

$$y = 4x - 5$$