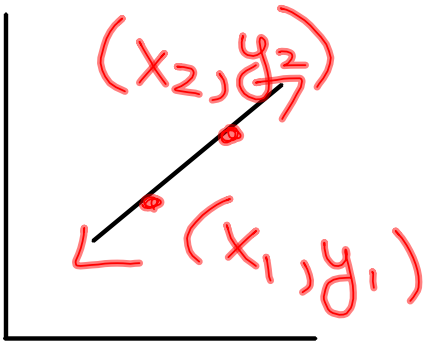
Lines



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

Positive slope $m = +$

Negative slope $m = -$

Zero slope $m = 0 = \frac{0}{a}$

Undefined slope $m = \frac{a}{0}$

Parallel Lines → never intersect

Slopes are equal/same

Perpendicular (Normal) Lines = lines that intersect at 90°

Slopes are opposite reciprocals of each other

Ex) $\frac{7}{8} \rightarrow -\frac{8}{7}$

Equations for Lines

Slope-intercept form : $y = mx + b$ (m: slope, b: y-intercept)

Point-slope form : $y - y_1 = m(x - x_1)$ ((x_1, y_1): point, m: slope)

Standard (General) form : $Ax + By = C$

A is (+)

A, B, C → integers (no decimals, no fractions)

A, B, C = GCF = 1

Ex 1) Write an equation for a line through (-2, -1) and (3, 4) using each form.

$m = \frac{4-(-1)}{3-(-2)} = \frac{5}{5} = 1$ (x, y)

Slope-intercept

$y = 1x + 1$

$4 = 1(3) + b$

$1 = b$

Point-Slope

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

Standard

$y = x + 1$

$-1 = x - y$

$x - y = -1$

Ex 2) Write an equation for a line perpendicular (normal) to $2x + 3y = 1$ and through (2, -1).

x_1, y_1

$3y = -2x + 1$

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

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

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