Look at $\frac{\text{rise}}{\text{run}}$ as $\frac{\text{the change in the y's}}{\text{the change in the x's}}$

$= \frac{3-(-1)}{4-(-2)} = \frac{4}{6} = \frac{2}{3}$

Unit 5: Linear Equations

5.7 General Form

The general form of the equation of a line is an equation in which all terms are collected on the left or right side of the equation. The general form is written as

$Ax+By+C=0,$

where A, B, and C are **integers**, and A is **positive**. Some texts refer Ax+By+C=0 as standard form. * no fractions * # in front of x positive

Ex.) Convert the following equation to general form.

a) $y = 5x - 8$

$-y \quad -y$

$0 = 5x - y - 8$

b) $y = \frac{2}{3}x + 7$

$-y$

$3\left[0 = \frac{2}{3}x - y + 7\right]$

$0 = 2x - 3y + 21$

c) $y = \frac{-1}{4}x + \frac{3}{5}$

$20\left[0 = -\frac{1}{4}x - y + \frac{3}{5}\right]$

$0 = 5x + 20y - 12$

* to get rid of fractions, multiply by LCM of denominators

* multiply by negative LCM *

Look at $\frac{\text{rise}}{\text{run}}$ as $\frac{\text{the change in the y's}}{\text{the change in the x's}}$

$= \frac{3-(-1)}{4-(-2)} = \frac{4}{6} = \frac{2}{3}$

Ex.) Determine the slope and y-intercept of the following lines:

a) $2x - 5y + 25 = 0$

$+5y \quad +5y$

$\frac{2x}{5} + \frac{25}{5} = \frac{5y}{5}$

$\frac{2}{5}x + 5 = y$

b) $6x + 2y - 15 = 0$

$-2y \quad -2y$

$\frac{6x}{-2} - \frac{15}{-2} = \frac{-2y}{-2}$

$-3x + \frac{15}{2} = y$

Ex.) The lines 3x-4y+8=0 and 5x-ky-6=0 have the same y-intercept. Determine the value of k.

$y = mx + b$

$3x - 4y + 8 = 0$

$+4y \quad +4y$

$\frac{3x}{4} + \frac{8}{4} = \frac{4y}{4}$

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

$5x - ky - 6 = 0$

$+ky \quad +ky$

$\frac{5x}{k} - \frac{6}{k} = \frac{ky}{k}$

$y = \frac{5}{k}x - \frac{6}{k}$

$2 = -\frac{6}{k}$

$k = -\frac{6}{2} = -3$

Look at $\frac{\text{rise}}{\text{run}}$ as

$\frac{\text{the change in the y's}}{\text{the change in the x's}}$

$= \frac{3-(-1)}{4-(-2)} = \frac{4}{6} = \frac{2}{3}$

slope

Ex.) Which of the following is/are perpendicular or parallel to the line $4x-2y+9=0$?

i) $6x+3y-1=0$

$-3y \quad -3y$

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

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

neither

ii) $x+2y-12=0$

$-2y \quad -2y$

$\frac{x}{-2} - \frac{12}{-2} = \frac{-2y}{-2}$

$-\frac{1}{2}x + 6 = y$

↑ perpendicular

$+2y \quad +2y$

$\frac{4x}{2} + \frac{9}{2} = \frac{2y}{2}$

$2x + \frac{9}{2} = y$