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

5.4 Parallel and Perpendicular Lines

Consider two lines with slopes m_1 and m_2.

* The lines are PARALLEL if they have the same slope.

Ex.) $m_1 = \frac{1}{2}$ $m_2 = \frac{3}{6}$

** The lines are PERPENDICULAR if the product of their slopes is -1.

Ex.) $\frac{2}{3} \cdot \frac{-3}{2} = \frac{-6}{6} = -1$

And/or the slopes are negative reciprocals of each other.

Ex.) diff. signs, flip fraction

$m_1 = \frac{2}{3}$ $m_2 = -\frac{3}{2}$

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.) Consider the line segment *AC* with a slope of 3/4.

a) Write the slope of line segment *GH* which is parallel to *AC*.

$m_{GH} = \frac{3}{4}$ $AC \parallel GH$

b) Write the slope of line segment *BF* which is perpendicular to *AC*.

$m_{BF} = -\frac{4}{3}$ $AC \perp BF$

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 if the following are parallel, perpendicular or neither.

a) $m_1 = \frac{1}{4}$, $m_2 = \frac{3}{12}$

$\ell_1 \parallel \ell_2$

parallel

*b) $m_1 = \frac{5}{7}$, $m_2 = \frac{14}{10} = \frac{7}{5}$

neither

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.) If *P* is the point (4, 7) and *Q* is the point (6, -2), find the slope of a line segment;

(x_1, y_1) (x_2, y_2)

$m_{PQ} = \frac{y_2-y_1}{x_2-x_1} = \frac{-2-7}{6-4} = \frac{-9}{2}$

a) parallel to line segment *PQ*.

$m = -\frac{9}{2} = -\frac{18}{4} = -4.5$

b) perpendicular to line segment *PQ*.

$m = \frac{2}{9} = \frac{4}{18} = \frac{6}{27}$