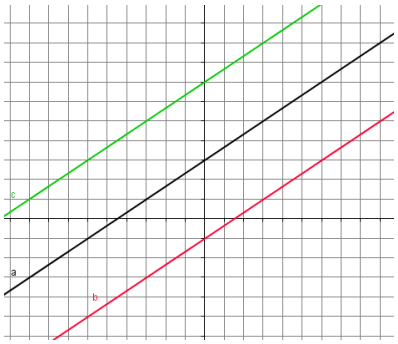
7.4 Parallel and Perpendicular Lines

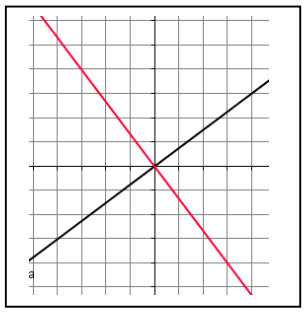
Investigate:

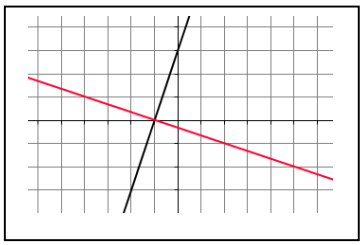


Calculate the slopes.

These three lines are _____

and have _____slopes





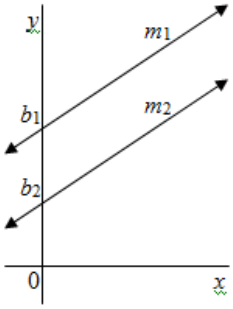
Calculate the slopes.

The line pairs are _____

And have _____slopes

PARALLEL LINES

Recall: Slope is a measure of a line's steepness.
Consider the steepness of parallel lines.



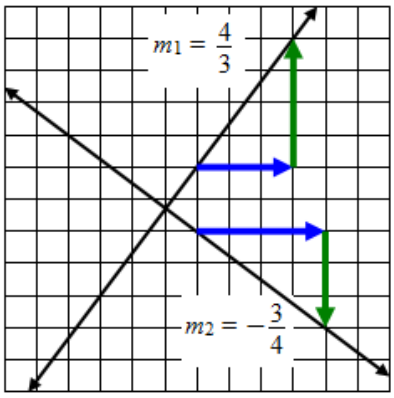
- Parallel lines have the same steepness.
- The _____ of parallel lines are *equal*; $m_1 = m_2$

- Parallel lines have different_____.

- Two lines with the same slope and the same *y*-intercept are at exactly the same location on the coordinate plane – these lines are said to be _____.

PERPENDICULAR LINES

Recall: Perpendicular lines form right angles (90° angles).



Consider the slopes of these perpendicular lines.

- The slopes of perpendicular lines are _____;

  $m_2 = -\frac{1}{m_1}$

- The product of the slopes from perpendicular lines is _____.

A horizontal line is perpendicular to a vertical line.

Example 1: The slopes of lines are given below. Determine the slope of any line parallel to these lines and then determine the slope of any line perpendicular to these lines.

Slope	3	$-\frac{4}{5}$	-1	0	$\frac{1}{2}$
Slope of a Parallel Line					
Slope of a Perpendicular Line					

Example 2: The following are slopes of parallel lines.
Find the value of k given what you know about the slopes of parallel lines.

a) $3, -\frac{6}{k}$

b) $-\frac{5}{6}, -\frac{k}{15}$

Example 3: The following are slopes of perpendicular lines. Find the value of k given what you know about the slopes of perpendicular lines.

a) $5, -\frac{k}{3}$

b) $-\frac{2}{3}, \frac{6}{k}$

Example 4: Given the graph of $2x + 3y - 12 = 0$.

a) Find the slope of any line parallel to the graph.

b) Find the slope of any line perpendicular to the graph.

Example 5: Determine the equation of the line that is parallel to $y = \frac{2}{3}x - 6$ and passes through (3, 1).

Example 6: Determine the equation of the line that is perpendicular to $y = \frac{1}{3}x - 1$ and passes through (-6, -1).

Example 7: Determine the equation of the line that is perpendicular to $2y + x = 4$ and an x-intercept of -3.

Assignment: p391 #1 - 8