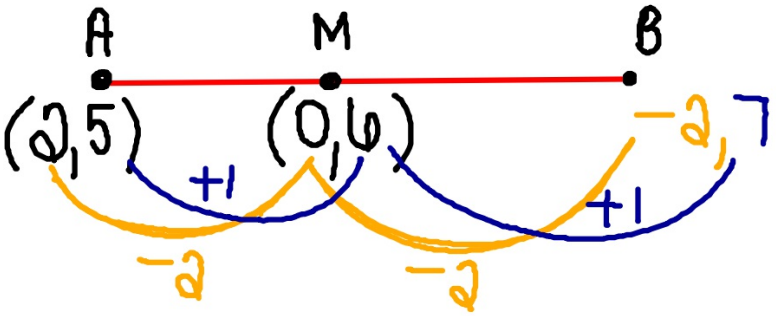
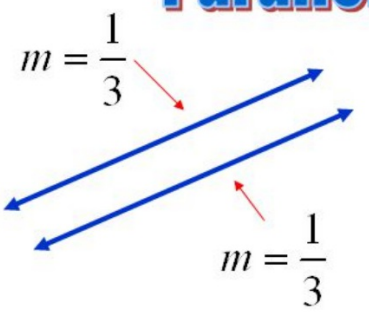
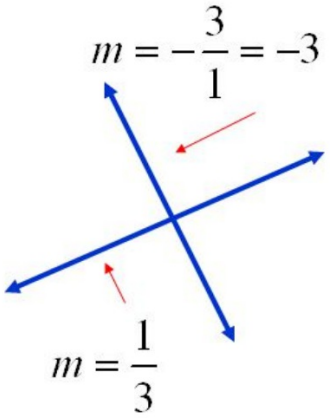

A
M
B
(2,5)
(0,6)
(-2,7)
+1
+1
-2
-2

Parallel and Perpendicular



Remember parallel lines have the same slopes so if you need the slope of a line parallel to a given line, simply find the slope of the given line and the slope you want for a parallel line will be the same.



Perpendicular lines have negative reciprocal slopes so if you need the slope of a line perpendicular to a given line, simply find the slope of the given line, take its reciprocal (flip it over) and make it negative.

WRITING PARALLEL & PERPENDICULAR EQUATIONS

What is this? Given an equation, you must create ANOTHER equation that is either parallel or perpendicular to this line, passing through a certain point.

Keep in mind the following points:

- Parallel equations have same slopes!
- Perpendicular equations have opposite Reciprocal slopes!

Parallel Lines

EXAMPLE 1:

Write the equation of the line that passes through the point **(-2, 7)** and is **PARALLEL** to the line **y = -4x + 1**

$y = mx + b$

$(-2, 7)$

$x \quad y$

same slope

$m = -4$

$7 = -4(-2) + b$

$7 = 8 + b$

$-8 \quad -8$

$-1 = b$

$y = -4x - 1$

EXAMPLE 2:

Write the equation of the line that passes through the point **(3, -1)** and is **PARALLEL** to the line **x – 3y = 9**

$y = mx + b$

$x - 3y = 9$

$-x \quad -x$

$\frac{-3y}{-3} = \frac{-x}{-3} + \frac{9}{-3}$

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

$m = \frac{1}{3}(3, -1)$

$-1 = \frac{1}{3}(3) + b$

$-1 = 1 + b$

$-1 \quad -1$

$-2 = b$

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

Perependicular Lines

EXAMPLE 3:

Write the equation of the line that passes through the point **(4, 3)** and is **PERPENDICULAR** to the line **y = 2x – 4**

$y = mx + b$

$m = 2$

$\perp$

$m = \frac{-1}{2}$

$(4, 3)$

$x \quad y$

$y = mx + b$

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

$3 = -2 + b$

$+2 \quad +2$

$5 = b$

$y = \frac{-1}{2}x + 5$

EXAMPLE 4:

Write the equation of the line that passes through the point **(-5, 1)** and is **PERPENICULAR** to the line **5x + 3y = -21**

$y = mx + b$

$5x + 3y = -21$

$-5x \quad -5x$

$\frac{3y}{3} = \frac{-5x}{3} - \frac{21}{3}$

$y = \frac{-5}{3}x - 7$

$m = \frac{-5}{3} \perp m = \frac{3}{5}$

$(-5, 1)$

$1 = \frac{3}{5}(-5) + b$

$1 = -3 + b$

$+3 \quad +3$

$4 = b$

$y = \frac{3}{5}x + 4$