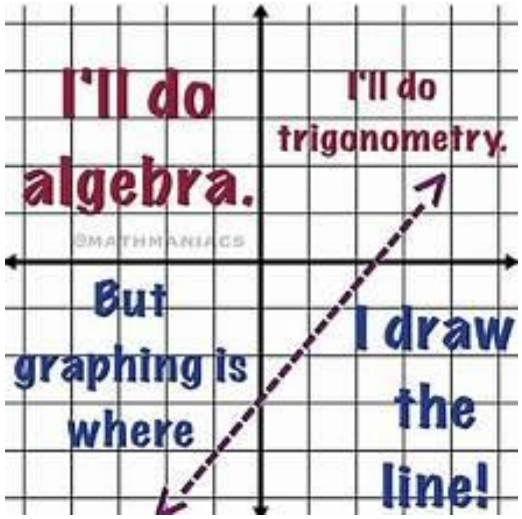
Review of Lines:

The general form for the equation of a line is $Ax + By = C$ **where *A* and *B* aren't both zero. The graph of all the solution pairs of the equation form a line.**

Examples:

1. $2x + 3y = 6$

2. $4x - y = 8$



3. $-2x+4y=-10$

4. $4y=12$

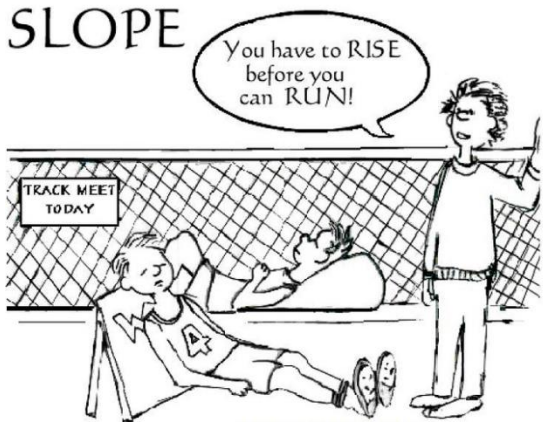
5. $-3x=24$

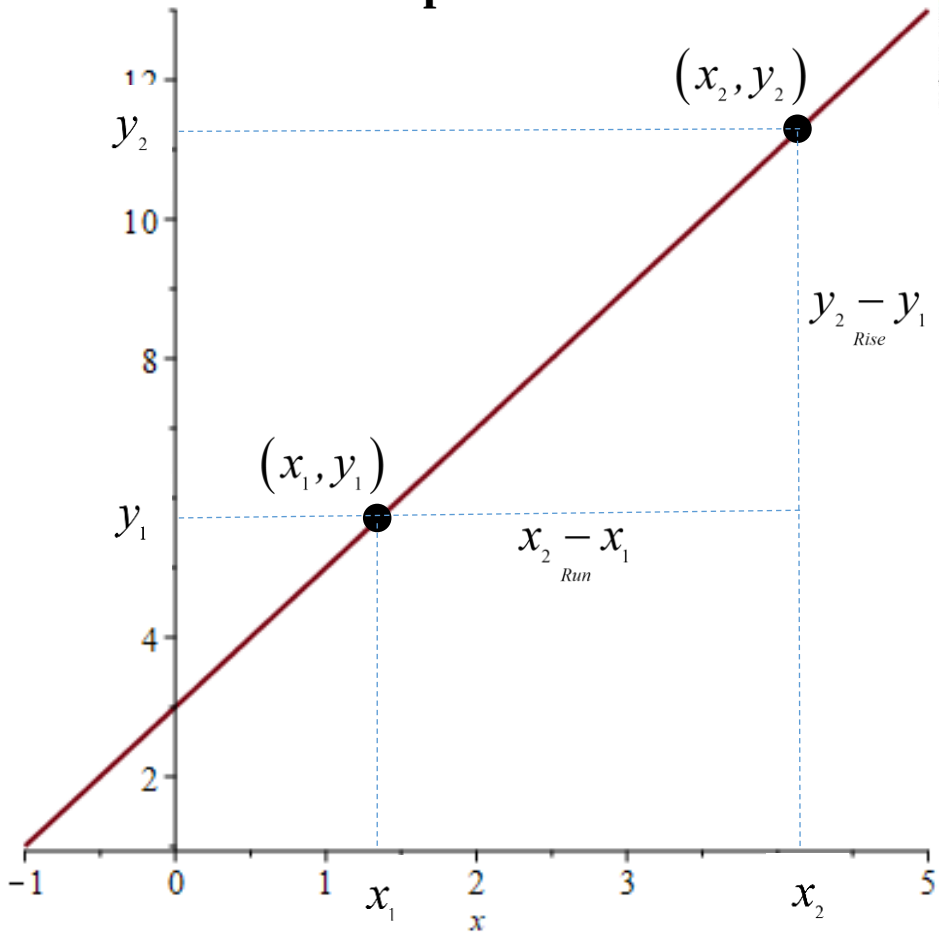
6. $x - y = 0$

7. $2x + y = 0$

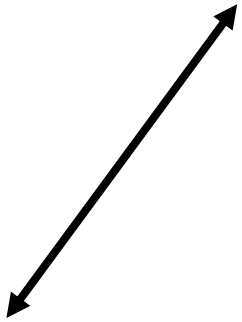
Slope:

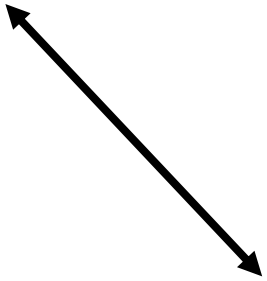
The slope of a line is a measure of its steepness and direction.





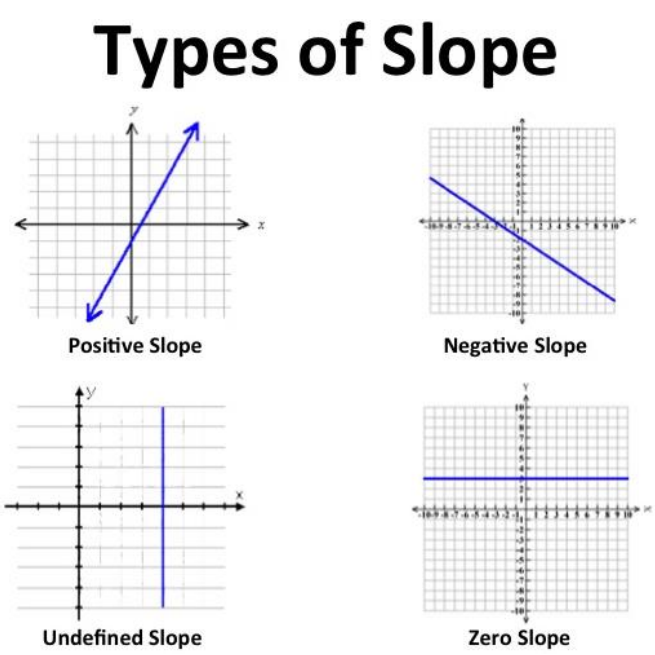
$$\text{slope} = m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{Rise}}{\text{Run}}$$

$m > 0$:  **up to the right**

$m < 0$:  **down to the right**

$m = 0$: **horizontal**

m undefined: **vertical**



Point-Slope form

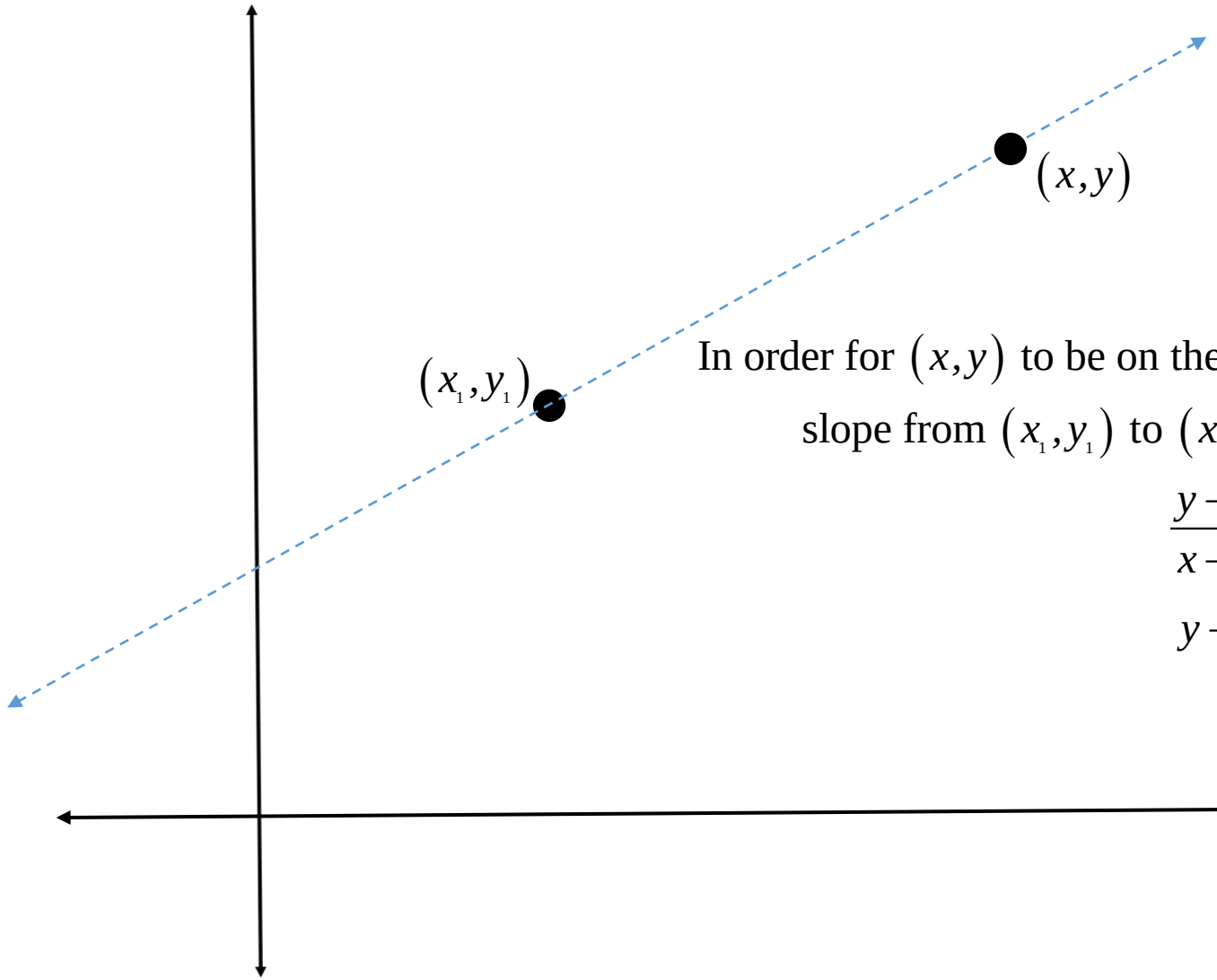
$(y - y_1) = m(x - x_1)$

m = slope
(x_1, y_1) = any point on the line

Finding Equations of Lines from their descriptions:

Point-Slope Form/Formula:

You are given a point on the line, (x_1, y_1), and the slope of the line, *m*.



In order for (x, y) to be on the line:

slope from (x_1, y_1) to $(x, y) = m$

$$\frac{y - y_1}{x - x_1} = m$$

$$y - y_1 = m(x - x_1)$$

Examples:

1. Through $(1,2)$ with a slope of 3.

2. Through $(1,-2)$ with a slope of $\frac{1}{2}$.

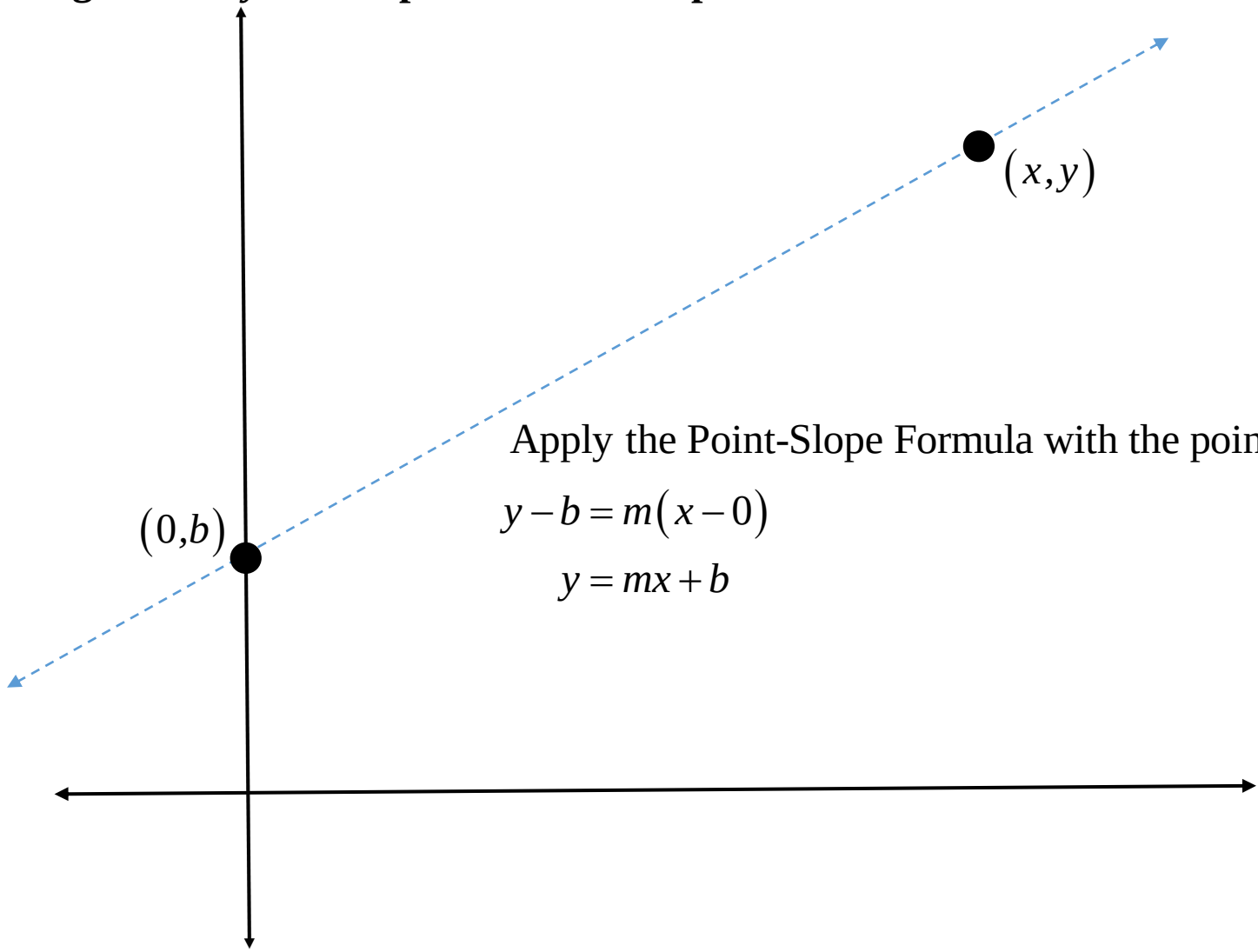
3. Through $(-1,0)$ with a slope of $-\frac{2}{3}$.

4. Through $\left(2,-\frac{1}{2}\right)$ with a slope of 0.

5. Through $(5,-8)$ with undefined slope.

Slope-Intercept Form/Formula:

You are given the *y*-intercept, *b*, and the slope of the line, *m*.



Apply the Point-Slope Formula with the point $(0,b)$:

$$y-b=m(x-0)$$

$$y=mx+b$$

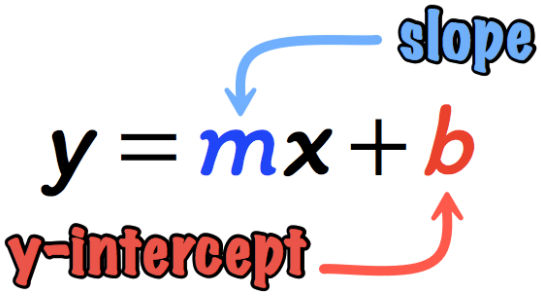
Examples:

1. *y*-intercept of 2 with a slope of 3.

2. *y*-intercept of -3 with a slope of $\frac{1}{2}$.

3. *y*-intercept of 0 with a slope of $-\frac{2}{3}$.

4. *y*-intercept of $\frac{1}{2}$ with a slope of 0.



Determine the slope and *y*-intercept of the following lines.

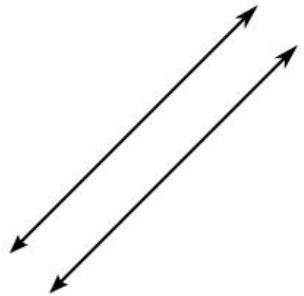
1. $y = 2x + 3$

2. $3y = 6$

3. $9x + 3y = 6$

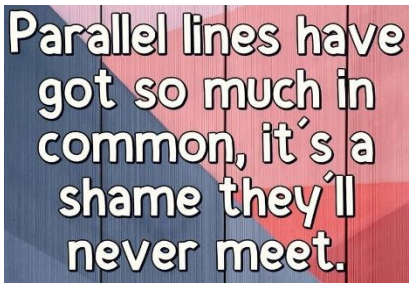
4. $4x = -8$

Two lines are parallel if their slopes are the _____.

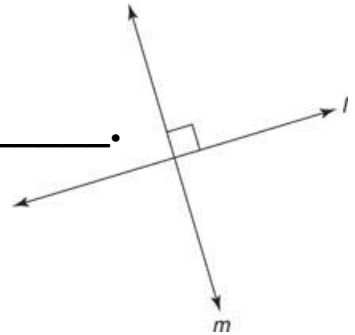


1. Find an equation of the line that passes through the point $(1,-2)$ and is parallel to the line with equation $y=-4x+5$.

2. Find an equation of the line that passes through the point $(1,-2)$ and is parallel to the line with equation $x=5$.



Two non-vertical lines are perpendicular if the product of their slopes is _____.



Every vertical line is perpendicular to every horizontal line.

1. Find an equation of the line that passes through the point $(1,-2)$ and is perpendicular to the line with equation $y=-4x+5$.

2. Find an equation of the line that passes through the point $(1,-2)$ and is perpendicular to the line with equation $x=5$.