

Two Lines - Points of Intersection

Line equation: $y = mx + b$

m = slope

b = y-intercept

Using slopes to determine # of Intersection Points

# of Intersection Points	Compare m & b of two lines
1	m 's are different
0	m are the same and b are different i.e. Lines are the parallel
All	m & b are the same i.e. Lines are the same

Example: Find intersection between

$$x + y = 4$$

$$2x - y = -10$$

By Computation:

$$\begin{array}{r} x + y = 4 \\ -y \quad -y \\ \hline x = 4 - y \end{array}$$



$$\begin{array}{r} 2x - y = -10 \\ 2(4 - y) - y = -10 \\ 8 - 2y - y = -10 \\ 8 - 3y = -10 \\ -8 \quad -8 \\ \hline -3y = -18 \\ -3 \quad -3 \\ \hline y = 6 \end{array}$$



$$\begin{array}{r} x + y = 4 \\ x + 6 = 4 \\ -6 \quad -6 \\ \hline x = -2 \end{array}$$

1. Solve one equation for a variable

2. Substitute that variable into the other equation

3. To find the other variable (in this case x) plug the variable into either equation and solve

By Graphing:

1. Convert each equation into slope-intercept formula ($y = mx + b$)

$$\begin{array}{ll} x + y = 4 & 2x - y = -10 \\ -x \quad -x & -2x \quad -2x \\ y = 4 - x & -y = -10 - 2x \\ y = -x + 4 & -1 \quad -1 \\ & y = 10 + 2x \\ & y = 2x + 10 \end{array}$$

2. Graph each equation and where they intersect is the answer

