

M10 - 8.1 - Number of Intersections System Notes

- 3 possible cases:**
- one solution
 - no solutions
 - infinite number of solutions.

One Solution Different slopes

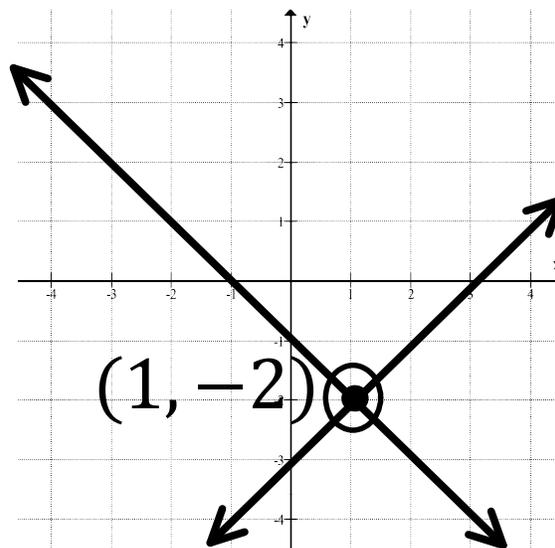
$$y = x - 3 \qquad y = -x - 1$$

$$m = 1 \qquad m = -1 \qquad \text{Different Slopes}$$

$$\begin{array}{r} x - y - 3 = 0 \\ +y \quad +y \\ x - 3 = y \end{array}$$

$$y = x - 3$$

Both to $y = mx + b$
Algebra
+y to Both Sides
Mirror

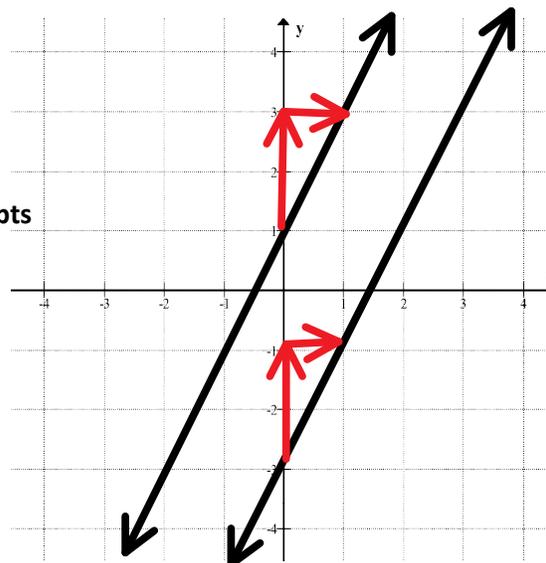


No Solutions Parallel Lines

$$y = 2x - 3 \qquad y = 2x + 1$$

$$\begin{array}{r} m = 2 \\ b = -3 \end{array} \qquad \begin{array}{r} m = 2 \\ b = 1 \end{array} \qquad \begin{array}{l} \text{Same slope} \\ \text{Different y-intercepts} \end{array}$$

These Lines Never Intersect



Infinite Solutions Same Line

$$y = x - 3 \qquad y = x - 3$$

$$\begin{array}{r} m = 1 \\ b = -3 \end{array} \qquad \begin{array}{r} m = 1 \\ b = -3 \end{array} \qquad \begin{array}{l} \text{Same slope} \\ \text{Same y-intercept} \end{array}$$

These Lines are on Top of Each Other

