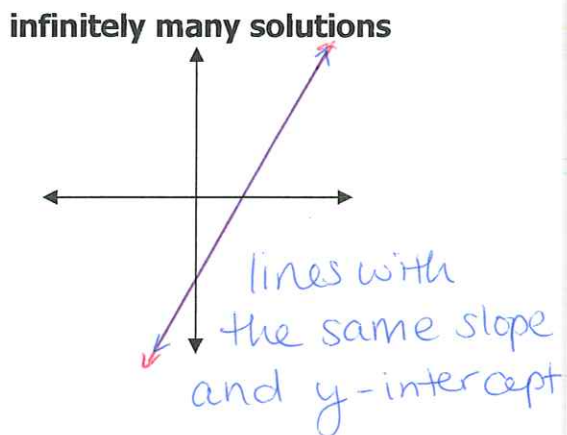
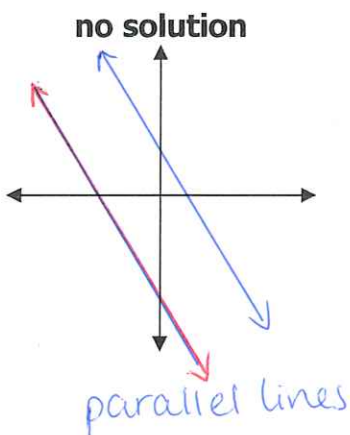
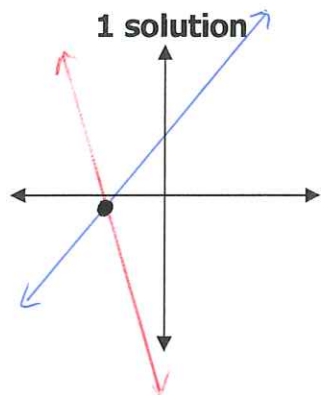


7.6 Properties of Systems of Linear Equations

A system of linear equations can have:



Example: Determine the number of solutions of each linear system.

a) $x + y = 3$
 $-2x - y = -2$

$$x + y = 3$$

$$y = -x + 3$$

$$-2x - y = -2$$

$$-y = 2x - 2$$

$$y = -2x + 2$$

one solution

b) $4x + 6y = -10$
 $-2x - 3y = 5$

$$4x + 6y = -10$$

$$6y = -4x - 10$$

$$y = \frac{-4x - 10}{6}$$

$$y = -\frac{2x}{3} - \frac{5}{3}$$

$$-2x - 3y = 5$$

$$-3y = 2x + 5$$

$$y = -\frac{2x}{3} - \frac{5}{3}$$

infinitely many solutions

c) $2x - 4y = -1$
 $3x - 6y = 2$

$$2x - 4y = -1$$

$$-4y = -2x - 1$$

$$y = \frac{2}{4}x + \frac{1}{4}$$

$$y = \frac{1}{2}x + \frac{1}{4}$$

$$3x - 6y = 2$$

$$-6y = -3x + 2$$

$$y = \frac{+3x - \frac{2}{6}}{6}$$

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

No solutions

Example: Given the equation $-6x + y = 3$, write another linear equation that will form a linear system with:

$$y = 6x + 3$$

a) exactly one solution

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

b) no solution

$$y = 6x - 10$$

c) infinitely many solutions

$$2(y = 6x + 3)$$

$$2y = 12x + 6$$