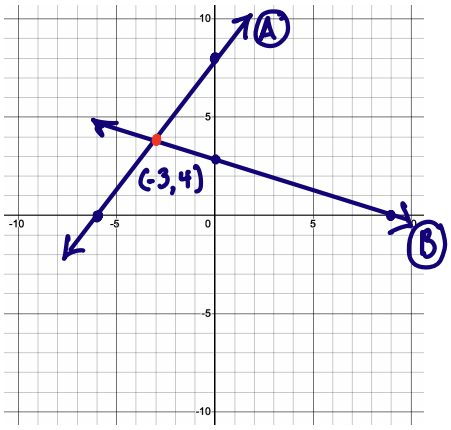
Linear Systems Skills

1. Solve the linear system by graphing, then confirm your answer by solving with substitution.

a) $-4x + 3y = 24$ (A)
$x + 3y = 9$ (B)



By substitution:

From (B)

$x + 3y = 9$
$-3y \quad -3y$
$x = -3y + 9$

Sub into (A)

$-4x + 3y = 24$
$-4(-3y+9) + 3y = 24$
$12y - 36 + 3y = 24$
$15y - 36 = 24$
$+36 \quad +36$

$\frac{15y}{15} = \frac{60}{15}$
$y = 4$

Sub into (B)

$x + 3y = 9$
$x + 3(4) = 9$
$x + 12 = 9$
$-12 \quad -12$
$x = -3$

Solution also (-3, 4) when solving by substitution.

Solution is? Appears to be (-3, 4) when graphing.

2. Solve the linear system by substitution. What do you notice?

Then solve by graphing to confirm what is happening.

$x + 3y = 12$ (A)
$2x + 6y = 6$ (B)

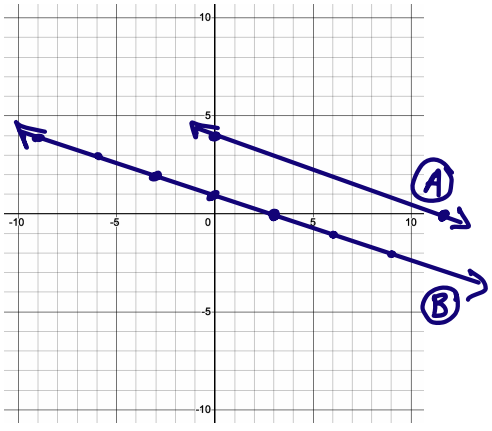
From (A):

$x + 3y = 12$
$-3y \quad -3y$
$x = -3y + 12$

Sub into (B)

$2x + 6y = 6$
$2(-3y + 12) + 6y = 6$
$-6y + 24 + 6y = 6$
$-24 \quad -24$
$0y = -18$

This statement is not true for any value of y.



The lines are parallel.

There are no solutions to this linear system.

3. Solve the linear system by substitution. What do you notice?

   Then solve by graphing to confirm what is happening.

$-2x + y = -1$ (A)

$y = 2x - 1$ (B)

Sub (B) into (A):

$-2x + y = -1$

$-2x + (2x - 1) = -1$

$-2x + 2x - 1 = -1$

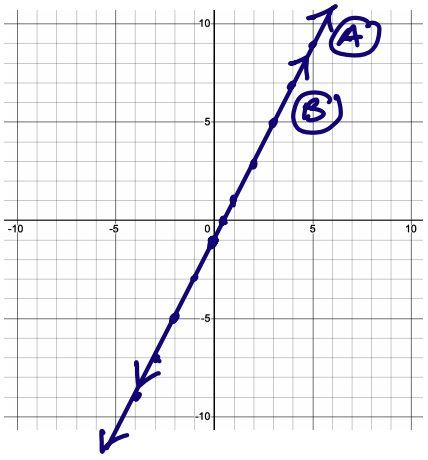
$+1 \quad +1$

$0x = 0$

This statement is true for all values of x.

The lines are co-incident (on top of each other).

There are an infinite number of solutions.



Recall

Adding and Subtracting Polynomials

Polynomials can be added or subtracted. In the past we arranged these operations horizontally:

$= (2x - 3y + 6) + (5x + 7y - 3)$
$= 2x - 3y + 6 + 5x + 7y - 3$
$= 7x + 4y - 3$

$= (7x - 2y + 5) - (-3x + 4y - 4)$
$= 7x - 2y + 5 + 3x - 4y + 4$
$= 10x - 6y + 9$

However, we can choose to arrange these operations vertically, like so:

$$\begin{array}{rr} & 2x - 3y + 6 \\ + & 5x + 7y - 3 \\ \hline & 7x + 4y - 3 \end{array}$$

$$\begin{array}{rr} & 7x - 2y + 5 \\ - & -3x + 4y - 4 \\ \hline & 10x - 6y + 9 \end{array}$$

4. Now, try adding or subtracting these polynomials.

a)

$$\begin{array}{rr} & 3x + 9y + 6 \\ + & 5x + 7y + 2 \\ \hline & \end{array}$$

$8x + 16y + 8$

b)

$$\begin{array}{rr} & 7x + 3y + 9 \\ - & 2x + 11y + 2 \\ \hline & \end{array}$$

$5x - 8y + 7$

c)

$$\begin{array}{rr} & 4x - 5y + 11 \\ + & 5x + 2y + 5 \\ \hline & \end{array}$$

$9x - 3y + 16$

d)

$$\begin{array}{rr} & -7x + 2y - 9 \\ - & 5x - y - 3 \\ \hline & \end{array}$$

$-12x + 3y - 6$