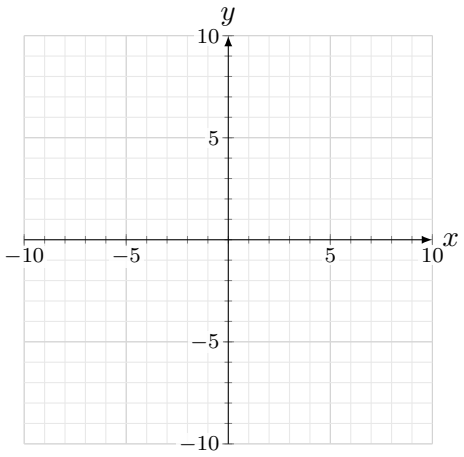
Linear Systems Skills

Show all your work. Use the grid beside each question for your graph.

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

$-4x + 3y = 24$

$x + 3y = 9$



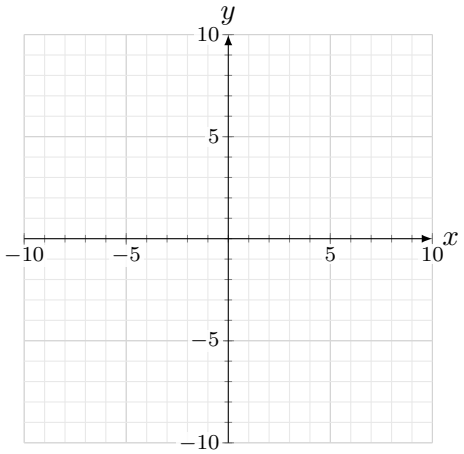
Solution: _____

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

Then solve by graphing to confirm what is happening.

$x + 3y = 12$

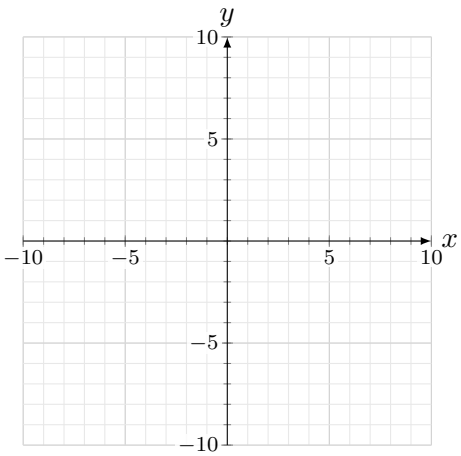
$2x + 6y = 6$



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

Then solve by graphing to confirm what is happening.

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



Recall: Adding and Subtracting Polynomials

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

$$\begin{aligned}&(2x - 3y + 6) + (5x + 7y - 3)\\ &= 2x - 3y + 6 + 5x + 7y - 3\\ &= 7x + 4y + 3\end{aligned}$$

$$\begin{aligned}&(7x - 2y + 5) - (-3x + 4y - 4)\\ &= 7x - 2y + 5 + 3x - 4y + 4\\ &= 10x - 6y + 9\end{aligned}$$

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

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

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

4. Now, try adding or subtracting these polynomials.

a) $\begin{array}{r} 3x + 9y + 6 \\ +\ \ 5x + 7y + 2 \\ \hline \end{array}$

b) $\begin{array}{r} 7x + \ 3y + 9 \\ -\ \ 2x + 11y + 2 \\ \hline \end{array}$

c) $\begin{array}{r} 4x - 5y + 11 \\ +\ \ 5x + 2y + \ 5 \\ \hline \end{array}$

d) $\begin{array}{r} -7x + 2y - 9 \\ -\ \ 5x - \ y - 3 \\ \hline \end{array}$

Linear Systems Skills — Final Answers

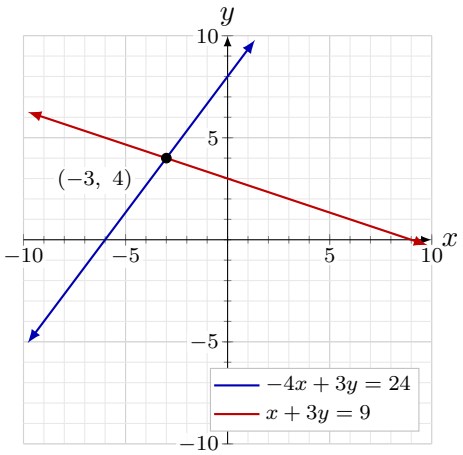
Final answers only, with each system's graph.

1. $-4x + 3y = 24$

$x + 3y = 9$

The lines cross at $(-3,\ 4)$. Solving by substitution gives the same point.

$\therefore$ the solution is $(-3,\ 4)$.



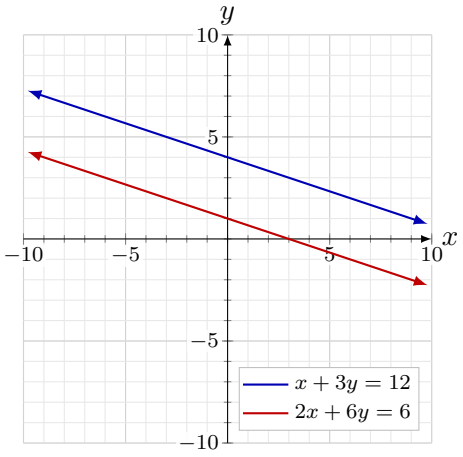
2. $x + 3y = 12$

$2x + 6y = 6$

Substitution gives $0y = -18$, which is not true for any value of y.

The lines are parallel.

$\therefore$ there is no solution.



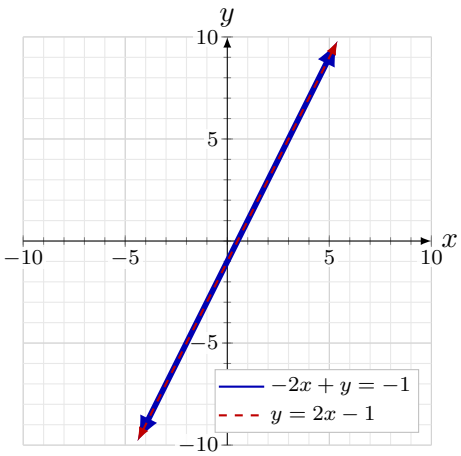
3. $-2x + y = -1$

$y = 2x - 1$

Substitution gives $0x = 0$, which is true for every value of x.

The lines are coincident: one lies on top of the other.

$\therefore$ there are infinitely many solutions.



Adding and subtracting polynomials

4. a) $8x + 16y + 8$ b) $5x - 8y + 7$ c) $9x - 3y + 16$ d) $-12x + 3y - 6$