

Solve the systems by substitution:

$$\begin{cases} 3x + y = 9 \\ 2x - 3y = 6 \end{cases}$$

① $3x + y = 9$ ②

$$\begin{array}{r} 3x + y = 9 \\ -3x \quad -3y \\ \hline y = -3x + 9 \end{array}$$

③ $2x - 3(-3x + 9) = 6$

$$\begin{array}{l} 2x + 9x - 27 = 6 \\ 11x - 27 = 6 \\ 11x = 33 \\ x = 3 \end{array}$$

④ $2(3) - 3y = 6$

$$\begin{array}{l} 6 - 3y = 6 \\ -3y = 0 \\ y = 0 \end{array}$$

$(3, 0)$

$$\begin{cases} 5x + 2y = -17 \\ x = 3y \end{cases}$$

② $5(3y) + 2y = -17$

③ $15y + 2y = -17$

$$17y = -17$$

$$y = -1$$

④ $x = 3(-1)$

$$x = -3$$

$(-3, -1)$

SOLVE SYSTEMS OF EQUATIONS BY ELIMINATION

1. Line up like terms for all equations.
2. Look for **inverse coefficients** that will eliminate one variable.

(If you can't find some, make some by multiplying.)

3. Add the equations.

(Eliminate one variable and solve for the other.)

4. Use the new value from #3 to find the other variable's value.

5. Write your answer as an ordered pair.

$$\begin{cases} 3y + x = 4 \\ y - 2x = 6 \end{cases}$$

$$\begin{array}{r} 3y + x = 4 \\ 6 \cdot y - 2x = 8 \\ \hline 7y = 14 \\ y = 2 \end{array}$$

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

$(-2, 2)$

Solve the system of equation by elimination:

$$\begin{array}{r}
 -1(-7x + 2y = 21) \\
 -3x + \cancel{2y} = 17 \\
 7x - \cancel{2y} = -21 \\
 \hline
 4x = -4 \\
 x = -1
 \end{array}$$

$$\begin{array}{r}
 -3(-1) + 2y = 17 \\
 3 + 2y = 17 \\
 2y = 14 \\
 y = 7
 \end{array}$$

$(-1, 7)$

Solve the system of equation by elimination:

$$\begin{array}{r}
 0/3(4x - 2y = -6) \\
 -7x + \cancel{6y} = 18 \\
 ③ \quad 12x - \cancel{6y} = -18 \quad ④ \\
 \hline
 5x = 0 \\
 x = 0
 \end{array}$$

$(0, 3)$

$$\begin{array}{r}
 4(0) - 2y = -6 \\
 0 - 2y = -6 \\
 -2y = -6 \\
 y = 3
 \end{array}$$

Solve the system of equation by elimination:

$$\begin{array}{r}
 -3(5x - y = -2) \\
 \cancel{15x} - 5y = 10 \\
 \cancel{-15x} + 3y = 6 \\
 \hline
 -2y = 16 \\
 y = \boxed{-8} \\
 5x - (-8) = -2 \\
 5x + 8 = -2 \\
 5x = -10 \\
 x = -2 \quad (-2, -8)
 \end{array}$$

$$\begin{array}{r}
 3(-4x + 4y = 12) \\
 4(-5x - 3y = -9) \\
 \hline
 -12x + 12y = 36 \\
 -20x - 12y = -36 \\
 \hline
 -32x = 0 \\
 x = 0 \\
 -4(0) + 4y = 12 \\
 y = 3 \\
 (0, 3)
 \end{array}$$