

## Solving Systems of Equations by Elimination

Solve each system by elimination.

$$\begin{array}{r} 1) \quad -4x - 2y = -12 \\ \quad \quad 4x + 8y = -24 \\ \hline \quad \quad 6y = -36 \\ \quad \quad \quad y = -6 \end{array}$$

$$\begin{array}{r} -4x - 2(-6) = -12 \\ -4x + 12 = -12 \\ -4x = -24 \\ x = 6 \end{array}$$

$(6, -6)$

$$\begin{array}{r} 2) \quad 4x + 8y = 20 \\ \quad \quad -4x + 2y = -30 \\ \hline \quad \quad 10y = -10 \\ \quad \quad \quad y = -1 \end{array}$$

$$\begin{array}{r} 4x - 8 = 20 \\ 4x = 28 \\ x = 7 \end{array}$$

$(7, -1)$

$$\begin{array}{r} 3) \quad x - y = 11 \\ \quad \quad 2x + y = 19 \\ \hline \quad \quad 3x = 30 \\ \quad \quad \quad x = 10 \end{array}$$

$$\begin{array}{r} 10 - y = 11 \\ -y = 1 \\ y = -1 \end{array}$$

$(10, -1)$

$$\begin{array}{r} 4) \quad -6x + 5y = 1 \\ \quad \quad 6x + 4y = -10 \\ \hline \quad \quad 9y = -9 \\ \quad \quad \quad y = -1 \end{array}$$

$$\begin{array}{r} -6x - 5 = 1 \\ -6x = 6 \\ x = -1 \end{array}$$

$(-1, -1)$

$$\begin{array}{r} 5) \quad -2x - 9y = -25 \\ -(-4x - 9y = -23) \\ \hline \quad \quad 2x = -2 \\ \quad \quad \quad x = -1 \end{array}$$

$$\begin{array}{r} 2 - 9y = -25 \\ -9y = -27 \\ y = 3 \end{array}$$

$(-1, 3)$

$$\begin{array}{r} 6) \quad 8x + y = -16 \\ -(-3x + y = -5) \\ \hline \quad \quad 11x = -11 \\ \quad \quad \quad x = -1 \end{array}$$

$$\begin{array}{r} -8 + y = -16 \\ y = -8 \end{array}$$

$(-1, -8)$

$$\begin{array}{r} 7) \quad -6x + 6y = 6 \\ -(-6x + 3y = -12) \\ \hline \quad \quad 3y = +18 \\ \quad \quad \quad y = 6 \end{array}$$

$$\begin{array}{r} -6x + 36 = 6 \\ -6x = -30 \\ x = 5 \end{array}$$

$(5, 6)$

$$\begin{array}{r} 8) \quad 7x + 2y = 24 \\ -(-8x + 2y = 30) \\ \hline \quad \quad -x = -6 \\ \quad \quad \quad x = 6 \end{array}$$

$$\begin{array}{r} 7(6) + 2y = 24 \\ 42 + 2y = 24 \\ 2y = -18 \\ y = -9 \end{array}$$

$(6, -9)$

$$\begin{array}{r} 9) \quad (5x + y = 9) \cdot 7 \\ \quad \quad 10x - 7y = -18 \\ \quad \quad 35x + 7y = 63 \\ \hline \quad \quad 45x = 45 \\ \quad \quad \quad x = 1 \end{array}$$

$$\begin{array}{r} 5 + y = 9 \\ y = 4 \end{array}$$

$(1, 4)$

$$\begin{array}{r} 10) \quad -4x + 9y = 9 \\ \quad \quad 4(x - 3y = -6) \\ \quad \quad 4x - 12y = -24 \\ \hline \quad \quad -3y = -15 \\ \quad \quad \quad y = 5 \end{array}$$

$$\begin{array}{r} -4x + 9(5) = 9 \\ -4x + 45 = 9 \\ -4x = -36 \\ x = 9 \end{array}$$

$(9, 5)$

$$\begin{array}{r} 11) \quad (-3x + 7y = -16) \cdot 3 \\ \quad \quad -9x + 5y = 16 \\ \quad \quad 9x - 21y = 48 \\ \hline \quad \quad -16y = 64 \\ \quad \quad \quad y = -4 \end{array}$$

$$\begin{array}{r} -3x - 28 = -16 \\ -3x = 12 \\ x = -4 \end{array}$$

$(-4, -4)$

$$\begin{array}{r} 12) \quad (-7x + y = -19) \cdot 3 \\ \quad \quad -21x + 3y = -57 \\ \quad \quad -21x + 3y = -57 \\ \hline \quad \quad 19x = 38 \\ \quad \quad \quad x = 2 \end{array}$$

$$\begin{array}{r} -7(2) + y = -19 \\ -14 + y = -19 \\ y = -5 \end{array}$$

$(2, -5)$

$$\begin{array}{r}
 13) \quad 16x - 10y = 10 \\
 \quad (-8x - 6y = 6) \cdot 2 \\
 \hline
 \quad -16x - 12y = 12 \\
 \hline
 \quad \quad -22y = 22 \\
 \quad \quad y = -1
 \end{array}$$

$$\begin{array}{r}
 16x + 10 = 10 \\
 16x = 0 \\
 x = 0 \\
 \boxed{(0, -1)}
 \end{array}$$

$$\begin{array}{r}
 14) \quad 8x + 14y = 4 \\
 \quad (-6x - 7y = -10) \cdot 2 \\
 \hline
 \quad -12x - 14y = -20 \\
 \hline
 \quad \quad -4x = -16 \\
 \quad \quad x = 4
 \end{array}$$

$$\begin{array}{r}
 32 + 14y = 4 \\
 14y = -28 \\
 y = -2 \\
 \boxed{(4, -2)}
 \end{array}$$

$$\begin{array}{r}
 15) \quad -4x - 15y = -17 \\
 \quad (-x + 5y = -13) \cdot 3 \\
 \hline
 \quad -3x + 15y = -39 \\
 \hline
 \quad \quad -7x = -56 \\
 \quad \quad x = 8
 \end{array}$$

$$\begin{array}{r}
 -8 + 5y = -13 \\
 5y = -5 \\
 y = -1 \\
 \boxed{(8, -1)}
 \end{array}$$

$$\begin{array}{r}
 16) \quad (-x - 7y = 14) \cdot 4 \\
 \quad -4x - 14y = 28 \\
 \quad 4x + 28y = -56 \\
 \hline
 \quad \quad 14y = -28 \\
 \quad \quad y = -2
 \end{array}$$

$$\begin{array}{r}
 -x + 14 = 14 \\
 -x = 0 \\
 x = 0 \\
 \boxed{(0, -2)}
 \end{array}$$

$$\begin{array}{r}
 17) \quad (-7x - 8y = 9) \cdot 9 \\
 \quad (-4x + 9y = -22) \cdot 8 \\
 \hline
 \quad -63x - 72y = 81 \\
 \quad -32x + 72y = -176 \\
 \hline
 \quad \quad -95x = -95 \\
 \quad \quad x = 1
 \end{array}$$

$$\begin{array}{r}
 -7 - 8y = 9 \\
 -8y = 16 \\
 y = -2 \\
 \boxed{(1, -2)}
 \end{array}$$

$$\begin{array}{r}
 18) \quad (5x + 4y = -30) \cdot 9 \\
 \quad (3x - 9y = -18) \cdot 4 \\
 \hline
 \quad 45x + 36y = -270 \\
 \quad 12x - 36y = -72 \\
 \hline
 \quad \quad 57x = -342 \\
 \quad \quad x = -6
 \end{array}$$

$$\begin{array}{r}
 -30 + 4y = -30 \\
 4y = 0 \\
 y = 0 \\
 \boxed{(-6, 0)}
 \end{array}$$

$$\begin{array}{r}
 19) \quad (-4x - 2y = 14) \cdot 5 \\
 \quad (-10x + 7y = -25) \cdot 2 \\
 \hline
 \quad -20x - 10y = 70 \\
 \quad +20x + 14y = +50 \\
 \hline
 \quad \quad -24y = 120 \\
 \quad \quad y = -5
 \end{array}$$

$$\begin{array}{r}
 -4x + 10 = 14 \\
 -4x = 4 \\
 x = -1 \\
 \boxed{(-1, -5)}
 \end{array}$$

$$\begin{array}{r}
 20) \quad (3x - 2y = 2) \cdot 5 \\
 \quad (5x - 5y = 10) \cdot 3 \\
 \hline
 \quad -15x + 10y = -10 \\
 \quad 15x - 15y = 30 \\
 \hline
 \quad \quad -5y = 20 \\
 \quad \quad y = -4
 \end{array}$$

$$\begin{array}{r}
 3x + 8 = 2 \\
 3x = -6 \\
 x = -2 \\
 \boxed{(-2, -4)}
 \end{array}$$

$$\begin{array}{r}
 21) \quad (5x + 4y = -14) \cdot 3 \\
 \quad (3x + 6y = 6) \cdot 5 \\
 \hline
 \quad -15x - 12y = 42 \\
 \quad 15x + 30y = 30 \\
 \hline
 \quad \quad 18y = 72 \\
 \quad \quad y = 4
 \end{array}$$

$$\begin{array}{r}
 5x + 16 = -14 \\
 5x = -30 \\
 x = -6 \\
 \boxed{(-6, 4)}
 \end{array}$$

$$\begin{array}{r}
 22) \quad (2x + 8y = 6) \cdot 5 \\
 \quad (-5x - 20y = -15) \cdot 2 \\
 \hline
 \quad 10x + 40y = 30 \\
 \quad -10x - 40y = -30 \\
 \hline
 \quad \quad 0 = 0
 \end{array}$$

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$$\begin{array}{r}
 23) \quad -14 = -20y - 7x \\
 \quad 10y + 4 = 2x
 \end{array}$$

$$\begin{array}{r}
 10y + 4 = 4 \\
 10y = 0 \\
 y = 0
 \end{array}$$

$\boxed{(2, 0)}$

$$\begin{array}{r}
 7x + 20y = 14 \\
 (-2x + 10y = -4) \cdot 2 \\
 \hline
 \quad 4x - 20y = 8 \\
 \hline
 \quad \quad 11x = 22 \\
 \quad \quad x = 2
 \end{array}$$

$$\begin{array}{r}
 24) \quad 3 + 2x - y = 0 \\
 \quad -3 - 7y = 10x
 \end{array}$$

$$\begin{array}{r}
 3 + 2x - 1 = 0 \\
 2 + 2x = 0 \\
 2x = -2 \\
 x = -1
 \end{array}$$

$$\begin{array}{r}
 (2x - y = -3) \cdot 5 \\
 -10x - 7y = 3 \\
 \hline
 \quad -12y = -12 \\
 \quad y = 1
 \end{array}$$

$\boxed{(-1, 1)}$