

5 Systems of Equations Practice Problems

1. Solve each of the systems of equations below by the method of your choice. If there are infinitely many solutions, find 3 solutions. If there are more than one solution and not infinitely many, find all of them.

$$\begin{array}{r} \text{(a)} \quad x - y = 2 \\ \quad 2x + 3y = 9 \end{array}$$

One solution: (3, 1)

$$\begin{array}{r} \text{(b)} \quad 2x + y = -1 \\ \quad x - 2y = -8 \end{array}$$

One solution: (-2, 3)

$$\begin{array}{r} \text{(c)} \quad x - 5y = 10 \\ \quad y^2 + 3y = x - 2 \end{array}$$

Two solutions: (0, -2) and (30, 4)

$$\begin{array}{r} \text{(d)} \quad 6x + 4y = 10 \\ \quad 9x + 6y = 15 \end{array}$$

Infinitely many solutions. Three solutions: (1, 1), (-1, 4), (3, -2)

$$\begin{array}{r} \text{(e)} \quad 5x + y = -1 \\ \quad x - 5y = -4 \end{array}$$

One solution: $(\frac{-9}{26}, \frac{19}{26})$

$$\begin{array}{r} \text{(f)} \quad 6x + 4y = 10 \\ \quad 3x + 2y = -2 \end{array} \quad \text{No Solutions.}$$

$$\begin{array}{r} \text{(g)} \quad y = 7 \\ \quad 3x - 2y = 11 \end{array}$$

One solution: $(\frac{25}{3}, 7)$

2. Suppose you have a system of equations where the graph of one equation is a circle and the graph of the other equation is a line. How many solutions are possible?

There could be 0, 1, or 2 solutions.

3. Suppose you have a system of equations where one equation is $y = |x|$ and the other equation is a line. How many solutions are possible?

There could be 0, 1, 2, or infinitely many solutions.

4. Find the intersection points of the graphs of $x = 1$ and $y = 5$.

One intersection point: (1, 5)

5. Find the intersection points of the graphs of $y = x^2$ and $y - 2x = 1$.

Two intersection points: $(1 + \sqrt{2}, 3 + 2\sqrt{2})$ and $(1 - \sqrt{2}, 3 - 2\sqrt{2})$