

6.2A Solving Systems by Substitution (isolated)

Solve each system by substitution.

Ex) $\begin{cases} x = -2y \\ 3x + 4y = -8 \end{cases}$

Step 1 **The variable x is already by itself.**

Step 2 **Step 3** **Step 4**

$$\begin{array}{l} 3x + 4y = -8 \\ 3(-2y) + 4y = -8 \\ -6y + 4y = -8 \\ \frac{-2y}{-2} = \frac{-8}{-2} \\ y = 4 \end{array}$$

$$\begin{array}{l} x = -2y \\ x = -2(4) \\ x = -8 \end{array}$$

$$\begin{array}{l} x = -2y \\ (-8) = -2(4) \\ -8 = -8 \quad \checkmark \end{array}$$

$(-8, 4)$ $3x + 4y = -8$

$$\begin{array}{l} 3(-8) + 4(4) = -8 \\ -24 + 16 = -8 \\ -8 = -8 \quad \checkmark \end{array}$$

Steps

- 1) Solve one of the equations for x or y .
 - This is already done for you for this section.
- 2) Substitute the expression into the other equation and solve for the variable.
- 3) Once you solved one for one of the variables, plug this solution into one of the original equations and solve for the other variable.
- 4) Check your answer by plugging it back into both equations and seeing if it holds true.

Solve each system by substitution.

1. $\begin{cases} x = 5 \\ x + y = 12 \end{cases}$

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

3. $\begin{cases} y = 5 \\ -3x + 4y = 8 \end{cases}$

4. $\begin{cases} y = 2x \\ x + y = 9 \end{cases}$

5. $\begin{cases} y = -3x \\ x + y = 4 \end{cases}$

6. $\begin{cases} x = 3y \\ x - 3y = 0 \end{cases}$

7. $\begin{cases} x = -2y \\ x - y = 9 \end{cases}$

8. $\begin{cases} y = 2x \\ -6x + 3y = 16 \end{cases}$

9. $\begin{cases} y = -3x \\ 4x - 2y = -20 \end{cases}$

Solve each system by substitution.

10.
$$\begin{cases} y = -3x + 4 \\ y = 4x - 10 \end{cases}$$

11.
$$\begin{cases} y = -4x + 2 \\ y = 6x - 8 \end{cases}$$

12.
$$\begin{cases} y = 3x - 4 \\ 4x + 3y = 1 \end{cases}$$

13.
$$\begin{cases} y = x - 4 \\ -4x - 6y = -16 \end{cases}$$

14.
$$\begin{cases} x = 3y + 1 \\ 2x + 4y = 12 \end{cases}$$

15.
$$\begin{cases} x = y - 4 \\ -2x + 3y = 6 \end{cases}$$

16. Next week your math teacher is giving a chapter test. The test will consist of 35 questions. Some problems are worth 2 points and some problems are worth 4 points. There are 20 questions worth 2 points. How many problems of 4 points are on the test?

Answers

- 1) (5, 7) 2) (-2, 2) 3) (4, 5) 4) (3, 6) 5) (-2, 6) 6) Infinite Solutions 7) (6, -3) 8) No Solution
9) (-2, 6) 10) (2, -2) 11) (1, -2) 12) (1, -1) 13) (4, 0) 14) (4, 1) 15) (-6, -2) 16) 15