

3-2 Solving Systems by Substitution



In math, substitutions only occur when replacements are of EQUAL value.



Steps:

1. Get a variable alone.
2. Substitute what that variable is equal to into the other equation.
3. Using your new equation, that consists of only one variable, solve for that unknown.
4. Be sure to solve for all variables (x, y) .

CAUTION

- ~ Use parenthesis when substituting. (signs/distribution/FOIL)
- ~ Don't forget to solve for both variables and write in (x, y) form.

Directions: Solve each system using substitution.

$$\#1 \begin{cases} -2x + 4y = 18 \\ 4x - 2y = 12 \end{cases}$$



Directions: Solve each system using substitution.

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



You can buy DVDs at a local store for \$15.49 each. You can buy them at an online store for \$13.99 each plus \$6 for shipping. How many DVDs can you buy for the same amount at the two stores? How much would it cost?

$x = \text{number of DVDs}$

$y = \text{cost}$

equation for local store:

equation for online:

*Four would
cost \$61.96*

What should your response be if you end up with something like:

$$-3 = 12$$

→ **No solution**

because

→ **they would be parallel
lines.**

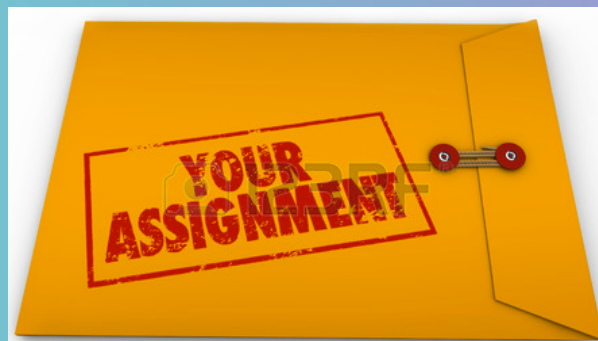
What should your response be if you end up with something like:

$$-3 = -3$$

→ **Infinitely many solutions**

because

→ **they would be coinciding lines.**



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10. (0.5, 2.5)

11. (-2, 4)

12. (20, 4)

Solve each system by substitution. Check your answers.

 See Problem 1.

10.
$$\begin{cases} 4x + 2y = 7 \\ y = 5x \end{cases}$$

11.
$$\begin{cases} 3c + 2d = 2 \\ d = 4 \end{cases}$$

12.
$$\begin{cases} x + 12y = 68 \\ x = 8y - 12 \end{cases}$$

13.
$$\begin{cases} 4p + 2q = 8 \\ q = 2p + 1 \end{cases}$$

14.
$$\begin{cases} x + 3y = 7 \\ 2x - 4y = 24 \end{cases}$$

15.
$$\begin{cases} x + 6y = 2 \\ 5x + 4y = 36 \end{cases}$$

16.
$$\begin{cases} t = 2r + 3 \\ 5r - 4t = 6 \end{cases}$$

17.
$$\begin{cases} y = 2x - 1 \\ 3x - y = -1 \end{cases}$$

18.
$$\begin{cases} r + s = -12 \\ 4r - 6s = 12 \end{cases}$$

19. **Money** A student has some \$1 bills and \$5 bills in his wallet. He has a total of 15 bills that are worth \$47. How many of each type of bill does he have?

 See Problem 2.