



Math Virtual Learning

Algebra 1 S1

**Find Solution to a Systems of equations using
Substitution (Introduction)**

April 20, 2020



Algebra I S1
Lesson: April 20, 2020

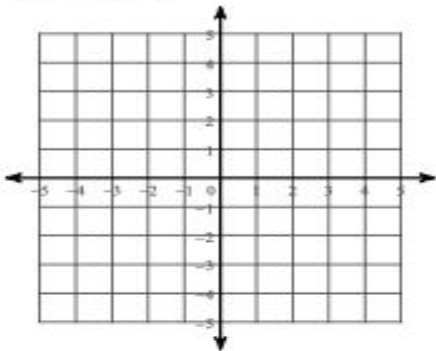
Objective/Learning Target:

Students will find the solution to a system of linear equations by using SUBSTITUTION

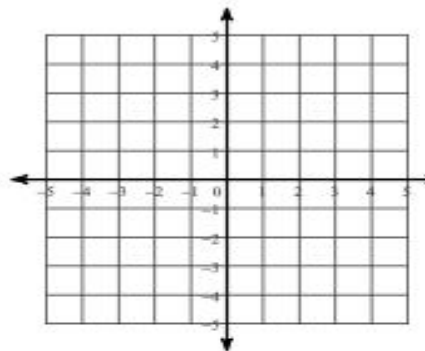
BELL RINGER

Solve each system by graphing (find the point of intersection of the two lines) .

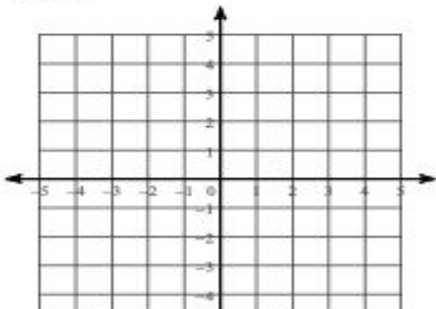
1) $y = 2x - 3$
 $y = -3x + 2$



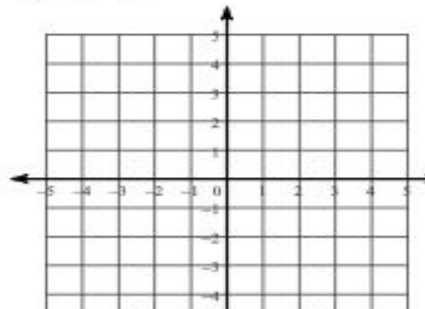
2) $y = -\frac{5}{3}x + 1$
 $y = -\frac{1}{3}x - 3$



3) $y = -x + 1$
 $x = 3$



4) $y = 4x + 1$
 $y = x - 2$





BELL RINGER-SOLUTION

1) $(1, -1)$

2) $(3, -4)$

3) $(3, -2)$

4) $(-1, -3)$

A Word About Substitution

- **Substitution** is a good method to use if one variable in one of the equations is already isolated.

Click to watch both videos.

[Video 1](#)

[Video 2](#)

Example #1

Solve the system using substitution.

$$\begin{aligned}y &= 4x \\x + 3y &= -39\end{aligned}$$

Substitution

Solve the system using substitution.

$$\begin{array}{l} y = 4x \\ \underline{x + 3y = -39} \end{array}$$

Since y is already isolated in the first equation, substitute the value of y for y in the second equation.

$$x + 3(4x) = -39$$

The result is one equation with one variable.

$$x + 12x = -39$$

$$13x = -39$$

$$x = -3 \quad \text{Continued on next slide.}$$

Substitution

After solving for x , solve for y by substituting the value for x in any equation that contains 2 variables.

$$y = 4x$$

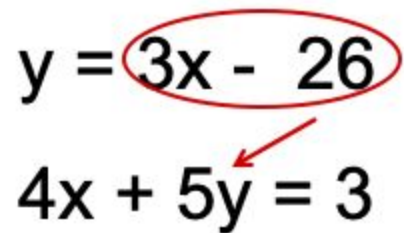
$$y = 4(-3)$$

$$y = -12$$

Write the solution as an ordered pair. $(-3, -12)$

Example #2

Solve using Substitution

$$y = 3x - 26$$
$$4x + 5y = 3$$


Solution

Substitute into $y = 3x - 26$ into (2). Substitute $x = 7$ into (1).

$$4x + 5y = 3$$

$$4x + 5(3x - 26) = 3$$

$$4x + 15x - 130 = 3$$

$$19x - 130 = 3$$

$$19x = 133$$

$$x = 7$$

$$y = 3x - 26$$

$$y = 3(7) - 26$$

$$y = -5$$

Solution (7, -5)

Practice 1

Solve the system by substitution.

1.
$$\begin{cases} x = -2 \\ x + y = 5 \end{cases}$$

2.
$$\begin{cases} x = 5 \\ 2x - 3y = 13 \end{cases}$$

3.
$$\begin{cases} y = 2x \\ -3x + 5y = -21 \end{cases}$$

Practice 1 - Answers

Solve the system by substitution.

1.
$$\begin{cases} x = -2 \\ x + y = 5 \end{cases}$$
$$(-2, 7)$$

2.
$$\begin{cases} x = 5 \\ 2x - 3y = 13 \end{cases}$$
$$(5, -1)$$

3.
$$\begin{cases} y = 2x \\ -3x + 5y = -21 \end{cases}$$
$$(-3, -6)$$

Practice 2

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

$$5. \begin{cases} x = -3y - 4 \\ 2x + 5y = -6 \end{cases}$$

$$6. \begin{cases} x = -2y + 1 \\ -4x - 7y = -1 \end{cases}$$

Practice 2 - Answers

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

$(4, 5)$

5.
$$\begin{cases} x = -3y - 4 \\ 2x + 5y = -6 \end{cases}$$

$(2, -2)$

6.
$$\begin{cases} x = -2y + 1 \\ -4x - 7y = -1 \end{cases}$$

$(-5, 3)$

EXIT PASS

Find the error in this problem. Explain

$$\begin{aligned}y &= x - 4 \\ -2x + y &= 18\end{aligned}$$

$$\begin{aligned}-2x + (x - 4) &= 18 \\ -x - 4 &= 18 \\ x &= 22\end{aligned}$$

$$\begin{aligned}y &= 22 - 4 \\ y &= 18\end{aligned}$$

Solution: (22, 18)