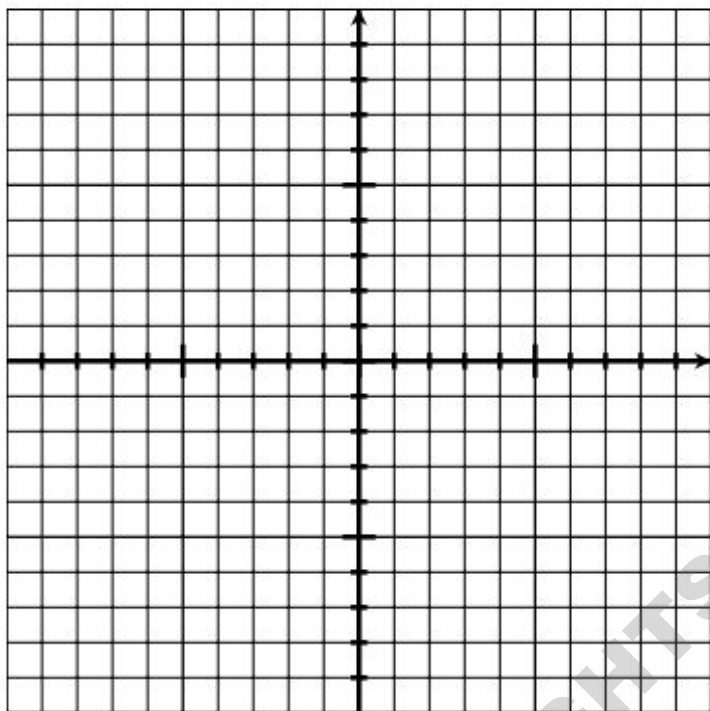


Lesson 2: Solving Systems of Equations by Substitution

In Lesson 1, you were able to graph a system of equations and state the solution by finding the intersection point. In Algebra, the solution won't always be an integer so we will need to know how to solve systems using other methods as well. Today, we will learn how to solve systems of equations by substitution.

Exercise #1: Let's begin with the following system of linear equations.



$$y = -2x + 5$$

$$y = \frac{3}{2}x$$

a) What do you notice about the intersection point?

Now, let's try to solve the system using the substitution method.

b) Since y is equal to $-2x + 5$, substitute $-2x + 5$ in for y in the second equation. Then, solve for the exact value of x .

c) Use the exact value you found for x to substitute into either equation. Now, find the exact value of y .

Exercise #2: Solve the following systems of equations using the substitution method.

a) $y = 2x + 6$
 $3x + y = -9$

b) $y = -3$
 $2x + 2y = 0$

c) $x - y = 4$
 $y = -4x + 6$

d) $y = 0.5x - 1.5$
 $0.25x + 0.75y = 4.25$

Exercise #3: Each of the examples in Exercise #2 were presented where one variable was already isolated. This will not always be the case. How would you go about solving the system of equations here?

$$8x - 2y = 4$$
$$2y + 3x = 7$$

In Lesson 3, you will learn how to solve a system of equations by elimination, for examples that are in the form of the one above.

In each of the examples in this lesson so far, you have successfully solved a system of equations using the substitution method, and obtained a rational solution. Now, we are going to look at various types of solutions you may encounter during your study of Algebra 1.

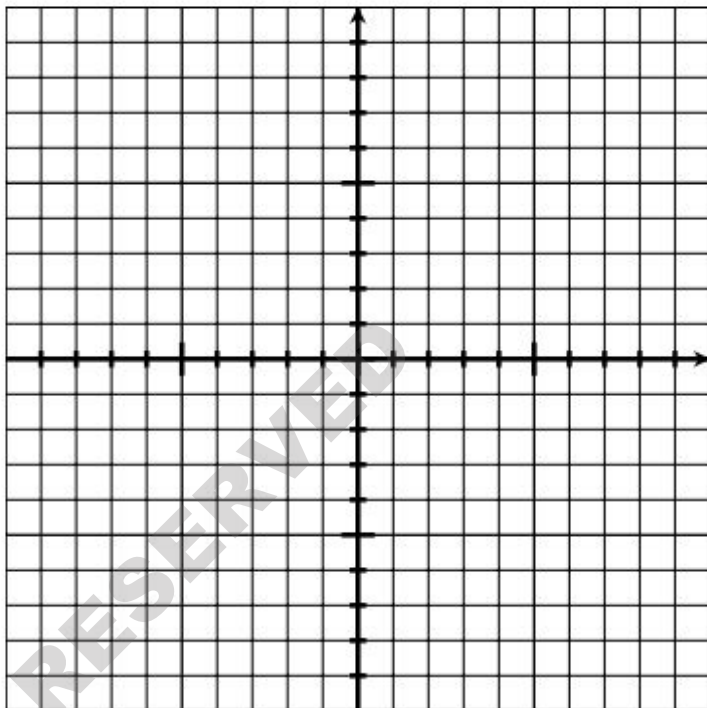
Exercise #4:

a) Solve the following system of equations using the substitution method.

$$y = x + 3$$

$$-3x + 3y = -3$$

b) Now, graph the two linear equations. What do you notice? Does this make sense with your solution in part "a"?

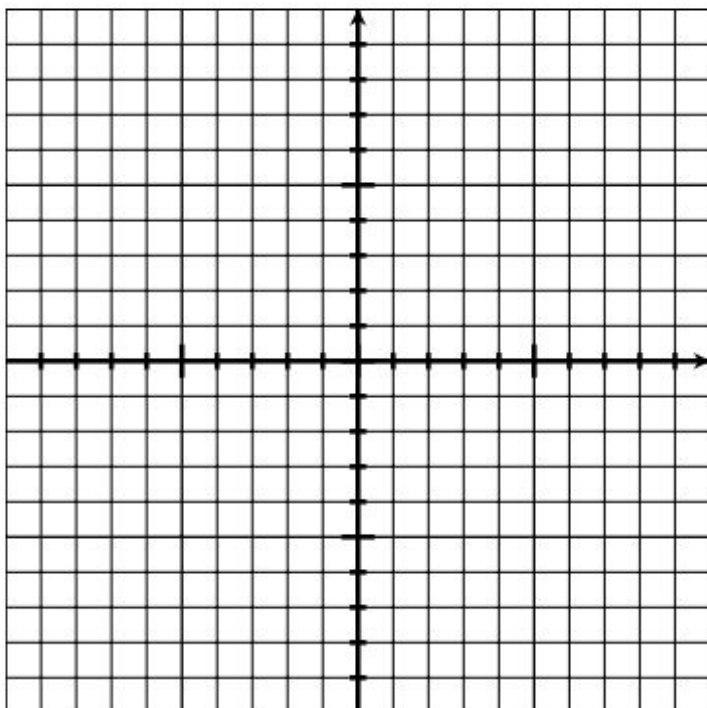
**Exercise #5:**

a) Solve the following system of equations using the substitution method.

$$y = 4 - 2x$$

$$-4y = 8x - 16$$

b) Now, graph the two linear equations. What do you notice? Does this make sense with your solution in part "a"?



Lesson 2 Extra Practice

EP1. Solve the following systems of equations using the substitution method.

a)
$$\begin{aligned} 2x - 3y &= -1 \\ y &= x - 1 \end{aligned}$$

b)
$$\begin{aligned} y &= -3x + 5 \\ 5x - 4y &= -3 \end{aligned}$$

c)
$$\begin{aligned} y &= 5x - 7 \\ -3x - 2y &= -12 \end{aligned}$$

d)
$$\begin{aligned} -4x + y &= 6 \\ -5x - y &= 21 \end{aligned}$$

e)
$$\begin{aligned} x &= 3y \\ 2x - 6y &= 0 \end{aligned}$$

f)
$$\begin{aligned} y &= 2x \\ -6x + 3y &= 16 \end{aligned}$$