

Systems of Equations

What do we do when we have two unknown variables?

If we have a situation where there are two unknowns, we can use a system of equations to solve for the unknowns.

For example: deciding between Cable vs Satellite TV, comparing salaries of basketball vs baseball players, etc.

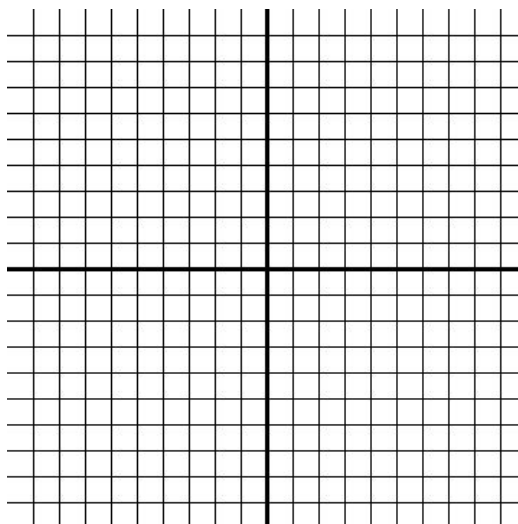
A system of equations is two equations:

$$y = 3x$$

$$y = -4x - 7$$

We can graph both lines to find the solution to the system.

What will be the "solution"?



Practice: Solve each system by graphing.

1. $-2x + y = 1$

$y = -x + 4$

2. $y + 2x = 0$

$2y = -x - 6$

3. $2x + 3y = -12$

$4x - 4y = 4$

Graph each system of equations.

1. $\frac{1}{2}x - y = 2$

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

2. $2y - x = 6$

$3x + y = -5$

What do you notice about these solutions? Is graphing always a good method?

Another method is to solve by substitution

$$y = 3x$$

$$y = -4x - 7$$

Notice both equations equal "y", therefore substitute one equation into the y of the other equation.

Remember the solution on the graph was a point (x,y), what's your next step?

Write the solution as an ordered pair (x,y)

Solve by substitution

$$y + 2x = 2$$

$$y + x = 1$$

Neither equation equals y, what could you do?

Practice: Solve each system of equations by substitution.

1. $y = 3x + 1$

2. $y = 2x + 2$

3. $3x + y = 4$

$y = -x + 5$

$y = -x - 1$

$x - 2y = 6$

Here are the equations we graphed before and couldn't find exact answers, now solve each system by substitution.

1. $\frac{1}{2}x - y = 2$
 $y = \frac{-2}{3}x$

2. $2y - x = 6$

$3x + y = -5$

How can you check to make sure your solutions are correct?

Can we determine whether a point is the solution the same way?
Why?

Determine whether $(2,10)$ is a solution for the systems.

1. $y = -3x + 16$

2. $y = -x + 12$

3. $x + 3y = 6$

$y = x + 8$

$x = -y + 16$

$-6 = 2x + 12$

Homework

Solving Systems of Equations Worksheet