

Algebra 1: 5.1 Solving Systems of Equations by Graphing.

System of Equations: A collection of two or more equations with the **same** set of variables.

Example we've already worked out in the past:

Video Store A charges \$9 to rent a video game for one week. Although only members can rent from the store, membership is free. Video Store B charges only \$4 to rent a video game for one week. Only members can rent from the store and membership is \$50 per year. After how many video-game rentals will the total amount spent at each store be the same? What will be the total amount spent at each store?

Store A: $y = 9x$

Store B: $y = 4x + 50$

← This is a
← system

What is a Solution to a system?

Any ordered pair that makes ALL equations TRUE when you plug the (x,y) into x and y is a solution.

Ex: Is the ordered pair a solution to the system? $(6, -1)$

$$\begin{array}{r} (6) \quad (-1) \\ 3x - 4y = 22 \\ 2x + 5y = 7 \\ (6) \quad (-1) \end{array}$$

$$\begin{array}{l} 3(6) - 4(-1) \stackrel{?}{=} 22 \\ 18 + 4 \stackrel{?}{=} 22 \\ 22 = 22 \end{array}$$

$$\begin{array}{l} 2(6) + 5(-1) \stackrel{?}{=} 7 \\ 12 - 5 \stackrel{?}{=} 7 \\ 7 = 7 \end{array}$$

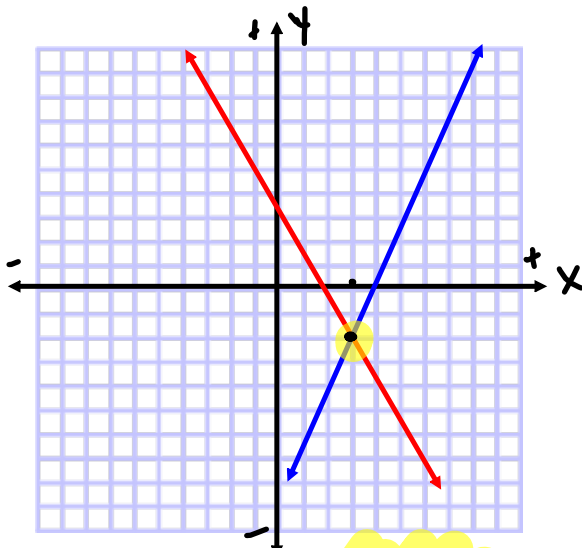
Yes, it is a solution

5.1 - Solving Systems by Graphing

Solutions in terms of Graphing: A solution is the point of Intersection of the two lines.

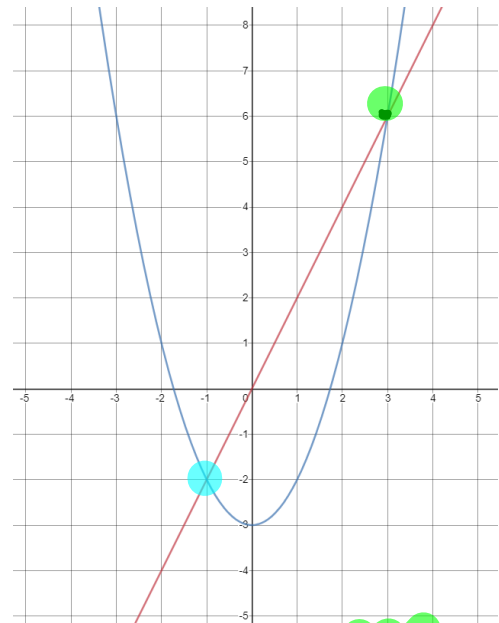
What are the solutions to the graphed systems below?

Ex 1:



Solution: $(3, -2)$

Ex 2:



Solutions: $(3, 6)$

$(-1, -2)$

There are 2 solutions
because there are 2 intersections.

5.1 - Solving Systems by Graphing

Ex: Solve the following system of equations using Graphing.

We will do this on our calculators.

$$y = -2x + 1$$

$$y = \frac{1}{3}x + 8$$

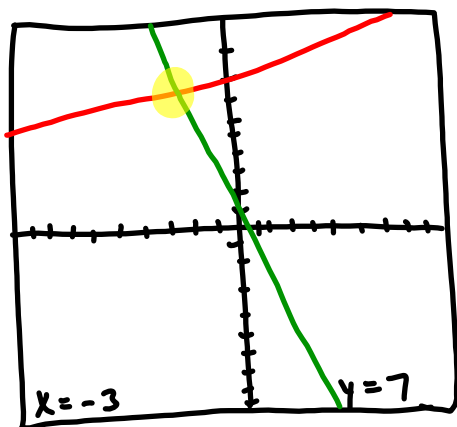
on calc.

$$x = -3$$

$$y = 7$$

so

$$(-3, 7)$$



Over the next few days we will learn more ways to solve systems of equations. You should use THIS method (Graphing) when the equations are either...

1. Already solved for y on both equations
 2. Easy to solve for y on both equations
-

Example: Find the solution(s) to the system.

$$* y = \frac{3}{2}x + 1$$

$$y - \cancel{6} = -x \quad * y = -x + \cancel{6}$$

put in calculator & find intersection.

Solution : (2,4)

5.1 - Solving Systems by Graphing

Ex: Solve the System of Equations.

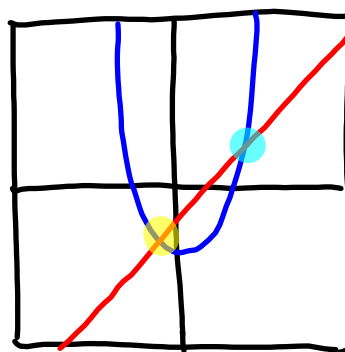
$$y = (x - 1)^2 - 3$$

$$y = 2x - 2$$

two solutions

$(0, -2)$

$(4, 6)$



Homework:

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Solving Graphically (Calculator):

1. Solve each equation for y .
2. Press the "y=" button at the top left.
3. Enter each equation in a separate line.
4. Press the Graph button (top right).
5. Press 2nd -> Trace (top right)
6. Go to the Intersect option.
7. Move the cursor (using the arrow keys) to ensure it is on the First line. Press Enter.
8. Move the cursor to ensure it is on the 2nd line. Press Enter.
9. When it says "Guess", move the cursor near the intersection point you want to find the ordered pair for.
10. Look at the bottom of the screen for your answer.
11. You will need to do this for each intersection. Follow steps 5-10 for each intersection point you want to find.