

Name: _____

Date: _____

Solving a System of Linear Equations Graphically Algebra 1

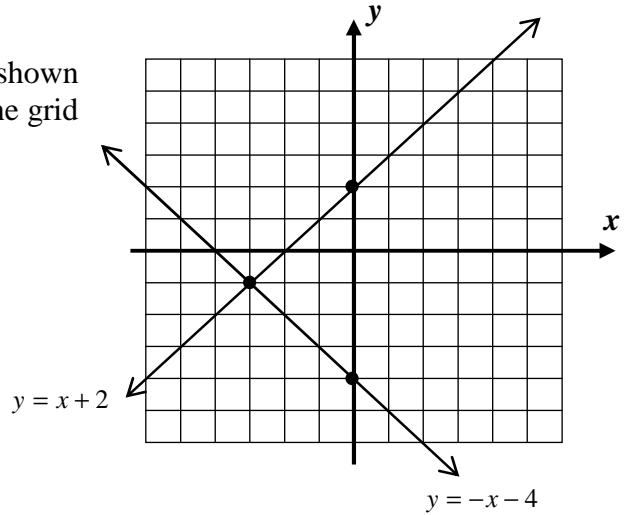
If two or more equations are given, we call this a **system of equations**. The solution to a system of equations consists of the set of all ordered pairs, (x, y) , that satisfy (make true) all of the equations in the system. In today's lesson, we will investigate ways of finding this solution set for two linear equations.

Exercise #1: Consider the system of linear equations shown below. The graphs of both linear functions are shown on the grid at the right.

$$y = x + 2$$

$$y = -x - 4$$

(a) What point lies on both lines?

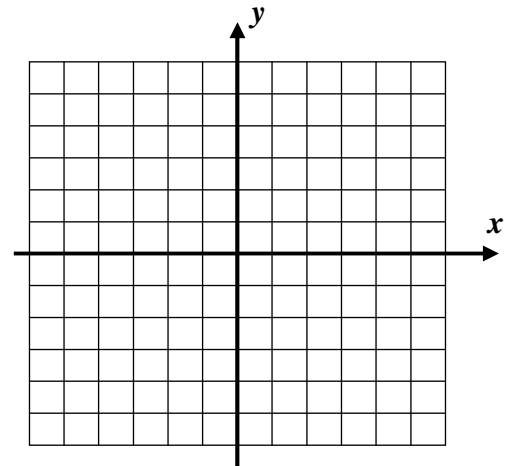


(b) Algebraically justify that the point from part (a) is the solution to this system of equations by checking to see if the point *satisfies* both equations.

Exercise #2: Solve the following system of linear equations by graphing each line using the slope and y-intercept method. Then, check your solution.

$$y + 2x - 5 = 0$$

$$y - x = 2$$



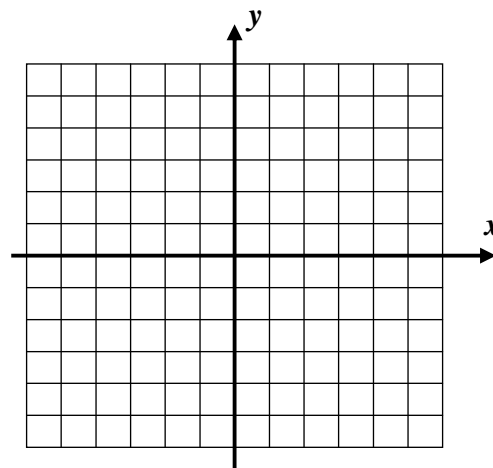
Exercise #3: Which of the following is a solution to the system of equations consisting of $y = 4x + 11$ and $y = -x + 1$?

- (1) $(0, 11)$ (3) $(-2, 3)$
 (2) $(3, -2)$ (4) $(2, 5)$

Exercise #4: Use your graphing calculator to set up an xy -chart for the following two linear functions. Then, solve the system of linear equations.

$$2y - x = 8$$

$$3y - 5x - 5 = 0$$

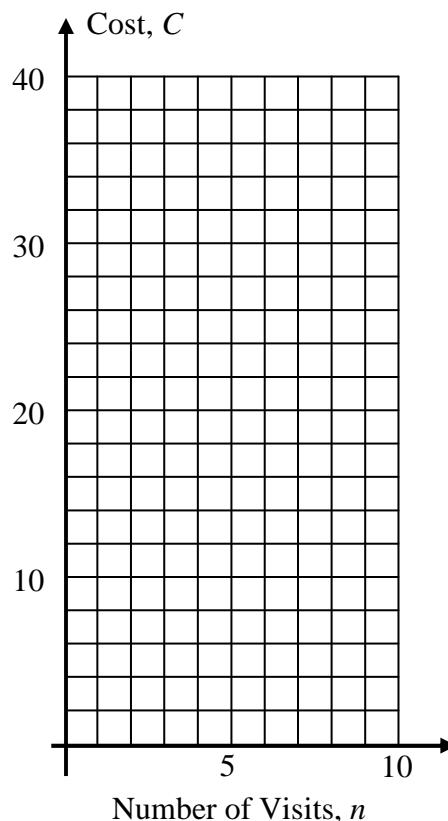


Exercise #5: Alice's Athletic Arena requires members to pay \$20 to join and members must pay \$1.50 for each time they come to work out. Roy's Romper Room requires members to pay \$5 to join and members must pay \$4 for each time they come to work out.

- (a) Set up two linear functions for the cost, C , of working out at each gym as a function of the number of times, n , that a person works out.

$$C_A = \quad \quad \quad C_R =$$

- (b) Use your graphing calculator to help you graph and label both functions on the grid to the right. Show your table below.



- (c) For how many visits, n , will the cost at both gyms be the same?

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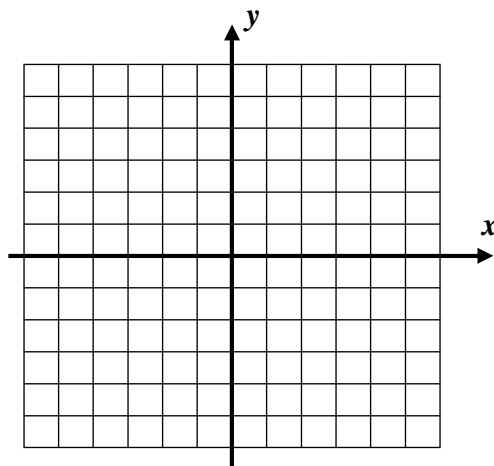
Solving a System of Linear Equations Graphically Algebra 1 Homework

Skills

For problems 1 through 3, solve each system graphically by using the slope and the y-intercept method to quickly graph your lines. Then, check your solutions with the aid of your calculator.

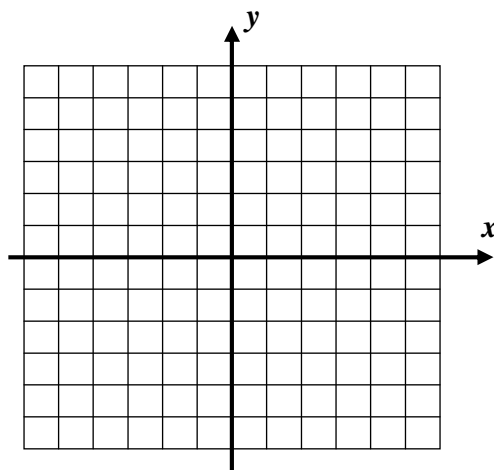
1. $y = 4x$

$$y = -x + 5$$



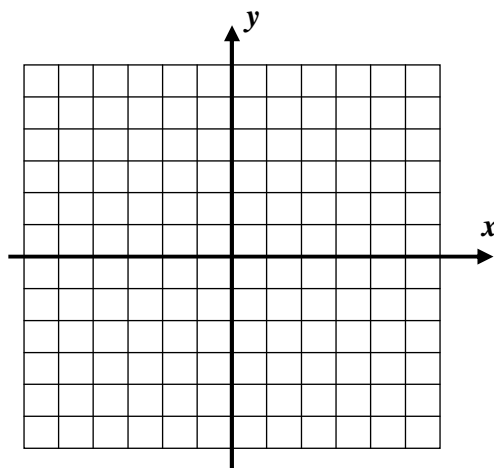
2. $y = \frac{2}{3}x - 4$

$$y = -\frac{4}{3}x + 2$$



3. $y = 2x + 1$

$$y = -\frac{1}{2}x + 6$$



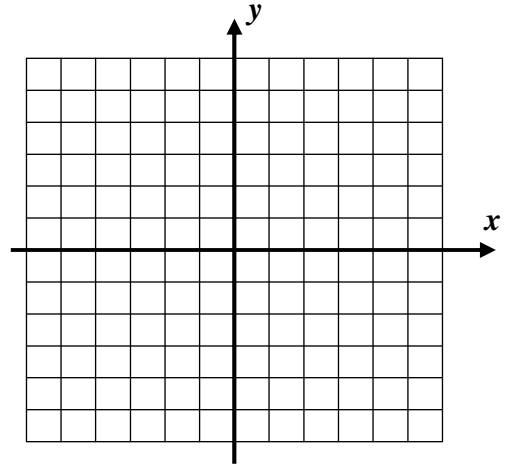
4. If drawn on the same graph, the lines with equations $y = 3x - 2$ and $y = -2x + 18$ would intersect at which of the following points?

- (1) (1, 1)
- (2) (4, 10)
- (3) (0, 18)
- (4) (3, 12)

5. Use your graphing calculator to set up an xy -chart for the following two linear functions. Then, solve the system of linear equations.

$$x + 3y = -7$$

$$2y - 3x = 10$$



Reasoning

6. Consider the linear system of equations shown to the right.

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

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

(a) Sketch a graph of this system on the axes to the right.

(b) Will these lines ever intersect? Justify.

(c) Considering your answer from part (b), explain why the solution set of this system is **empty** (contains no ordered pairs). A system such as this one that has no solution is called an **inconsistent system**.

