

Dear Family,

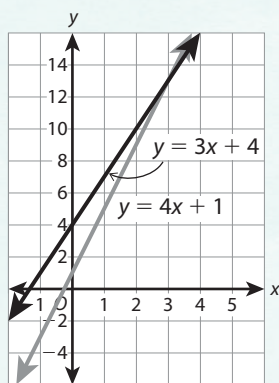
Your child is learning about systems of equations.



A system of two equations is a set of two related equations. The solution of a system of linear equations can be represented on a graph by the point or points that both lines have in common. A system of linear equations can have one solution, no solution, or infinitely many solutions.

$$y = 4x + 1$$

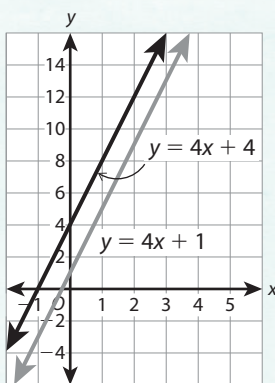
$$y = 3x + 4$$



The lines intersect and have one point in common. This point represents the solution.

$$y = 4x + 1$$

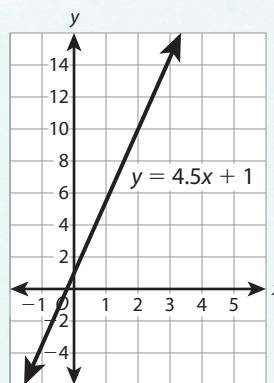
$$y = 4x + 4$$



The lines are parallel and have no points in common. The system has no solution.

$$y = 4.5x + 1$$

$$y = \frac{1}{2}(9x + 2)$$



The lines are the same line. There are infinite solutions because every point on the line is a solution to both equations.

Consider the following example:

How many solutions does this system of linear equations have?

$$y = 2x + 5 \text{ and } y = 5x + 2$$

On the next page you will see how your child might find the number of solutions that a system of linear equations has.



Understand Systems of Equations: Sample Solution

How many solutions does this system of linear equations have?

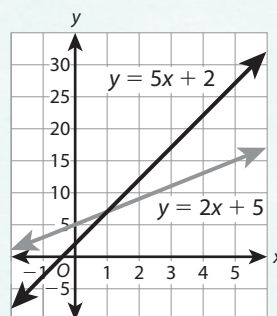
$$y = 2x + 5 \text{ and } y = 5x + 2$$

One way: Use a graph.

Make a table of values by substituting values for x into each equation and finding the value of y . Plot the points.

$y = 2x + 5$			
x	0	1	2
y	5	7	9

$y = 5x + 2$			
x	0	1	2
y	2	7	12



The graph shows that the lines intersect at the point $(1, 7)$. The system has exactly one solution.

Another way: Use the equations.

The equations are in the form $y = mx + b$, where m is the slope and b is the y -intercept. Compare the slopes and y -intercepts to determine the number of solutions the system has.

$$\begin{array}{l} y = 2x + 5 \\ y = 5x + 2 \end{array}$$

↑ ↑
slope y -intercept

The equations have different slopes so the system has exactly one solution regardless of whether the y -intercepts are different or the same.

Answer: Both methods show that the system has exactly one solution.