Big Ideas Math: Blue

Parent Newsletter

Chapter 5: Systems of Linear Equations

Students will...

Write and solve systems of linear equations by graphing.

Write and solve systems of linear equations by substitution.

Write and solve systems of linear equations by elimination.

Solve systems of linear equations with no solution or infinitely many solutions.

Solve linear equations by graphing a system of linear equations.

Solve real-life problems.

Key Terms

A ***system of linear equations*** is a set of two or more linear equations in the same variables.

A ***solution of a system of linear equations*** in two variables is an ordered pair that is a solution of each equation in the system.

Standards

Common Core:
8.EE.7: Solve linear equations in one variable.

8.EE.8: Analyze and solve pairs of simultaneous linear equations.

Key Ideas

Solving a System of Linear Equations by Elimination

Step 1: Multiply, if necessary, one or both equations by a constant so at least 1 pair of like terms has the same or opposite coefficients.

Step 2: Add or subtract the equations to eliminate one of the variables.

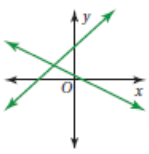
Step 3: Solve the resulting equation for the remaining variable.

Step 4: Substitute the value from Step 3 into one of the original equations and solve.

Solutions of Systems of Linear Equations

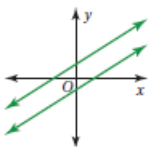
A system of linear equations can have *one solution*, *no solution*, or *infinitely many solutions*.

One solution



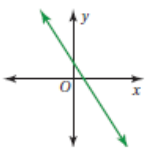
The lines intersect.

No solution



The lines are parallel.

Infinitely many solutions



The lines are the same.

Solving a System of Linear Equations by Graphing

Step 1: Graph each equation in the same coordinate plane.

Step 2: Estimate the point of intersection.

Step 3: Check the point from Step 2 by substituting for x and y in each equation of the original system.

Solving a System of Linear Equations by Substitution

Step 1: Solve one of the equations for one of the variables.

Step 2: Substitute the expression from Step 1 into the other equation and solve for the other variable.

Step 3: Substitute the value from Step 2 into one of the original equations and solve.

Solving Equations Using Graphs

Step 1: To solve the equation $ax + b = cx + d$, write two linear equations.

$ax + b = cx + d$

$y = ax + b$ and $y = cx + d$

Step 2: Graph the system of linear equations. The x-value of the solution of the system of linear equations is the solution of the equation $ax + b = cx + d$.

Reference Tools

Write important vocabulary or formulas in this space.

system of linear equations

solution of a system of linear equations

Solving systems of linear equations by graphing

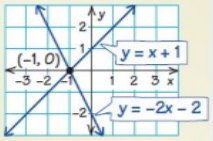
Step 1: Graph each equation.

Step 2: Estimate the point of intersection.

Step 3: Check the point from Step 2.

Example:

Solve the system. $y = x + 1$, $y = -2x - 2$



The solution is (–1, 0).

Write your notes about the topic in this space.

Write your questions about the topic in this space.

Will a system of linear equations always have a solution?

A **Notetaking Organizer** can be used to write notes, vocabulary, and questions about a topic. In the space on the left, write important vocabulary or formulas. In the space on the right, write notes about the topic. In the space at the bottom, write questions about the topic.

Essential Questions

How can you solve a system of linear equations?

How can you use substitution to solve a system of linear equations?

How can you use elimination to solve a system of linear equations?

Can a system of linear equations have no solution? Can a system of linear equations have many solutions?

Quick Review

Methods for Solving Systems of Linear Equations:

Method	When to Use
Graphing	To estimate solutions
Substitution	When one of the variables in one of the equations has a coefficient of 1 or − 1
Elimination	When at least 1 pair of like terms has the same or opposite coefficients
Elimination (Multiply First)	When one of the variables cannot be eliminated by adding or subtracting the equations

Elimination vs. Substitution method:

- With elimination, you add or subtract equations to eliminate a variable.
- With substitution, you write an equation in one variable by substituting an expression for the other variable.
- In both methods, you solve the resulting equation for one variable and use its value to find the other variable.

What's the Point?

The ability to solve systems of linear equations is very useful in real life for events like finding break-even points. Ask your student to make a business plan for a lemonade stand that includes set-up costs, how much it will cost to make the lemonade, and how much he or she plans to charge for each glass. How much lemonade would he or she have to sell to make their invested money back?

The STEM Videos available online show ways to use mathematics in real-life situations.
The Chapter 5: Gold Alloys STEM Video is available online at www.bigideasmath.com.