G8 Playlist: Solving Pairs of Linear Equations Graphically

Aligns with *CCSS.MATH.CONTENT.8.EE.C.8.A: Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.*

CCSS.MATH.CONTENT.8.EE.C.8.B: Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.

Related Standards

- *CCSS.MATH.CONTENT.8.EE.C.7: Solve linear equations in one variable.*

- *CCSS.MATH.CONTENT.8.EE.C.8.C: Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*

- *CCSS.MATH.CONTENT.HSA.REI.C.6: Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.*

- *CCSS.MATH.CONTENT.HSA.REI.D.11: Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.*

Objectives

In this module, you will learn and practice the following skills:

- Understand the solution of a system of linear equations.

- Predict the number of solutions of a system of linear equations.

- Solve a system of linear equations graphically.

Let's get started!

Key Terms

- A **linear equation** is an equation with solutions that form a straight line.

- A **solution** of a linear equation or system of linear equations is an ordered pair (x, y) that makes the equation(s) true.

- A **system** of linear equations is two or more linear equations with the same variables.

- The **intersection** of two graphs is the point at which the graphs meet.

Solving Pairs of Linear Equations Graphically

(8.EE.C.8.A; 8.EE.C.8.B)

A **solution** to a pair of **simultaneous linear equations** is an **ordered pair** (x, y) that is a solution to both equations. Graphically, the solution of a pair of linear equations is the point of **intersection** of the two lines. This is because the graph of a linear equation in two variables is the set of all ordered pairs that are solutions of the equation. The point of intersection of two lines lies on both lines, so the ordered pair must be a solution of each equation.

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

- If the equations have different slopes and y-intercepts, the lines will intersect at one point and the pair has one solution.

- If the equations have the same slopes and different y-intercepts, the lines are parallel and the pair has no solutions.

- If the equations have the same slopes and the same y-intercepts, the equations describe the same line and the pair has infinitely many solutions.

If your students…

Misinterpret the number of solutions based on the slopes and y-intercepts of the equations:

WATCH: Predict the Number of Solutions a System of Two Equations in Two Variables has by Inspection

https://www.opened.com/video/predict-the-number-of-solutions-a-system-of-two-linear-equations/139541

Miscalculate slope or y-intercept of a line given two points on the line:

WATCH: Determine Whether 2 Lines Intersect

https://learnzillion.com/lessons/164-determine-whether-2-lines-intersect

Have difficulty graphing equations in standard form:

WATCH: Estimating Solutions of Equations: Graphing

https://learnzillion.com/student/lessons/155-estimate-solutions-of-equations-graphing

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