

Unit 3 Expressions and Equations

Grade 8 Math

Unit Description:

Students will graph and compare proportional relationships. The concept of slope will be explored and used to write the equation of a line in slope-intercept form. Students will solve linear equations and determine the number of solutions. Solving linear equations will include variables on both sides of the equal sign. Students will solve simple systems of equations both graphically and algebraically and determine the number of solutions.

Standards for Mathematical Practice

- MP.1 Make sense of problems and persevere in solving them.
- MP.2 Reason abstractly and quantitatively.
- MP.3 Construct viable arguments and critique the reasoning of others.
- MP.4 Model with mathematics.
- MP.5 Use appropriate tools strategically.
- MP.6 Attend to precision.
- MP.7 Look for and make use of structure.
- MP.8 Look for and express regularity in repeated reasoning.

Louisiana Student Standards for Mathematics (LSSM)

EE – Expressions and Equations	
B. Understand the connections between proportional relationships, lines, and linear equations.	
8.EE.B.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. <i>For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.</i>
8.EE.B.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .

C. Analyze and solve linear equations and pairs of simultaneous linear equations.

8.EE.C.7

Solve linear equations in one variable.

a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).

b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

8.EE.C.8

Analyze and solve pairs of simultaneous linear equations.

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.

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.*

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.*

Enduring Understandings:

- *Linear equations in one variable can have one solution, infinitely many solutions, or no solutions.
- *An equation can be written for two quantities that vary proportionally.
- *The unit rate for a data set that represents a proportional relationship can be interpreted as slope when the data is graphed on a coordinate plane.
- *The slope m is the same for any two distinct points on a non-vertical line graphed on the coordinate plane.
- *Graphs of linear equations that intersect the y -axis at any point other than the origin $(0, 0)$ do not represent proportional relationships.
- *The points (x, y) on a non-vertical line are the solutions of the equation $y = mx + b$.

Essential Questions:

- *How can I communicate mathematical information and ideas more effectively?
- *How do we understand and represent linear relationships and various nonlinear relationships?
- *What is the meaning of slope?
- *How can we transfer data and information between multiple representations? (e.g. graphs, tables, equations, descriptions, etc.)
- *What is the difference between a ratio and a unit rate?
- *How can proportional relationships be used to represent authentic situations in life and solve actual problems?
- *What does the point of intersection of two simultaneous equations represent?