

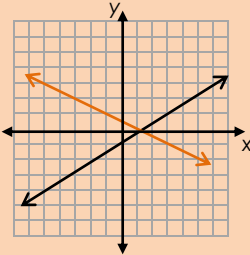
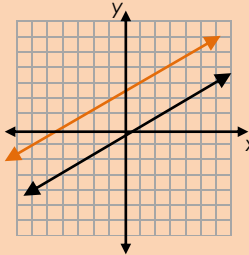
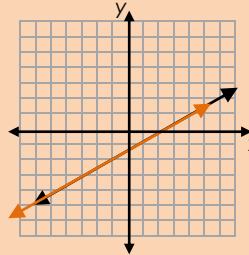
## Unit 7: Linear Equations and Systems I

Dear Parents/Guardians,

Unit 7 is the first of two units to investigate linear equations in one variable and systems of linear equations in two variables. In Lesson 1, students graph systems of equations and interpret the solutions. Students use substitution to rewrite a system of equations as one equation. In Lesson 2, students revisit cups and counters as a model to solve equations in one variable with the variables on both sides by building and drawing. In Lesson 3, they transition to solving equations algebraically.

### What is a System of Linear Equations?

A system of linear equations is a set of two or more linear equations with the same variables. The solution set is the set of values that, when substituted in for the variables, makes all the equations in the system true. Students graph systems of linear equations to determine its solutions.

One Solution	No Solution	Infinitely Many Solutions
When the lines intersect at only one point.	When the lines are parallel (never intersect).	When equations are equivalent their lines coincide.
		

### Solving Equations

In Lesson 2, students continue to use the cups and counters to model solving equations. Students use properties of arithmetic and properties of equality to solve equations using "legal moves". In Lesson 3 students transition to solving equations without the model.

Equation/ Algebraic Steps	Drawing
$-2(x - 3) = 3x + 1$ $-2x + 6 = 3x + 1$	$\begin{array}{c} \wedge \quad + + + \\ \wedge \quad + + + \end{array} \Bigg  \begin{array}{c} \vee \vee \vee \\ + \end{array}$
$-2x + 6 = 3x + 1$ $-1 \quad -1$	$\begin{array}{c} \wedge \quad \wedge \\ + + + + + \\ - \end{array} \Bigg  \begin{array}{c} \vee \vee \vee \\ + \\ - \end{array}$
$-2x + 5 = 3x$ $+2x \quad +2x$	$\begin{array}{c} \wedge \quad \wedge \\ \vee \vee \\ + + + + + \end{array} \Bigg  \begin{array}{c} \vee \vee \vee \\ \vee \vee \end{array}$
$\frac{5}{5} = \frac{5x}{5}$ $x = 1$	$+ + + + + \Bigg  \vee \vee \vee \vee \vee$



# MathLinks

GRADE 8

### By the end of the unit, your student should know...

- How to solve systems of equations by graphing [Lesson 7.1]
- That systems of linear equations that have one, zero, or infinitely many solutions [Lesson 7.1]
- How to use substitution to rewrite systems of equations as a single equation [Lesson 7.1]
- How to solve equations using a model [Lesson 7.2]
- That equations in one variable have one, zero, or infinitely many solutions [Lesson 7.3]
- How to solve equations algebraically [Lesson 7.3]

### Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- Solutions to linear equations: [https://youtu.be/qsL\\_5Y8uWPU](https://youtu.be/qsL_5Y8uWPU)
- Graphing solutions for systems of linear equations: <https://youtu.be/5a6zpf150go>