Unit 8: Equations and Systems 2

Dear Parents/Guardians,

Unit 8 is a continuation of the topics in Unit 7. Students continue to solve linear equations algebraically, including those involving fractions and decimals. Students learn how to solve systems of equations using algebra. Students use algebra to solve various problems involving linear equations.

Solving Equations Algebraically

Students learn to solve linear equations with non-integer rational numbers in at least two ways.

Example: $\frac{1}{8}(8x-3)=2x+\frac{3}{4}$

Method 1: Solve with Fractions	Method 2: "Remove" the Fraction
Students use properties of arithmetic and properties of equality to solve equations. For equations with fractions, this may include renaming fractions with a common denominator.	Students may find the lowest common multiple of the denominators and use the multiplication property of equality to simplify each side of the equation. They will use a similar strategy for solving equations with decimals.
$\frac{1}{8}(8x-3)=2x+\frac{3}{4}$ $x-\frac{3}{8}=2x+\frac{3}{4}$ $-x=\frac{3}{4}+\frac{3}{8}$ $-x=\frac{6}{8}+\frac{3}{8}$ $x=-\frac{9}{8}$	$\frac{1}{8}(8x-3)=2x+\frac{3}{4}$ $8\left[\frac{1}{8}(8x-3)\right]=\left(2x+\frac{3}{4}\right)8$ $8x-3=16x+6$ $-8x=9$ $x=-\frac{9}{8}$

Solving Systems of Equations with Substitution

Substitution is a good strategy to use when there is an isolated variable, or it is easy to isolate a variable.

Example: $\begin{cases} y+3x=1 \\ 2x-y=4 \end{cases}$

Isolate one of the variables. For this system, we can isolate y in the first equation by subtracting 3x from both sides.	$y+3x=1$ $y=-3x+1$
Replace (substitute) the y in the second equation with -3x + 1.	$2x-y=4$ $2x-(-3x+1)=4$ $2x+3x-1=4$
Solve for x.	$2x+3x-1=4$ $5x=5$ $x=1$
Replace (substitute) the x in the first equation with 1 and solve for y.	$y+3x=1$ $y+3(1)=1$ $y=-2$
The solution for the system of equations is (1, -2) because this ordered pair is a solution for both equations.	

Center For Mathematics And Teaching

MathLinks GRADE 8

By the end of the unit, your student should know…

- How to solve equations with rational numbers algebraically [Lesson 8-1]
- How to use algebraic methods to solve linear systems of equations [Lessons 8.2 and 8.3]
- How to set up equations and solve problems [Lesson 8.3]

Additional Resources

- For definitions and additional notes please refer to Student Resources at the end of this unit.
- Solving linear equations with decimals algebraically: https://youtu.be/QJoGTMzoFNA
- Substitution: https://youtu.be/uzyd_mlJaoc