

Unit 4 – Lesson 8

Name: _____

Linear Equations in Disguise

Date: _____ **Period:** _____

Focus Standard: 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 $a = b$ result (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.

Student Outcomes

- Students rewrite and solve equations that are not obviously linear equations using properties of equality.

Some linear equations may not look like linear equations upon first glance.

A simple example that you should recognize is noted below. Solve the equation.

$$\frac{x}{5} = \frac{6}{12}.$$

Example 1. Solve the given equation.

$$\frac{7}{3x+9} = \frac{1}{8}$$

Example 2. Given a linear equation in disguise, we will try to solve it. To do so, we must first assume that the following equation is true for some number x .

$$\frac{x-1}{2} = \frac{x+\frac{1}{3}}{4}$$

Example 3. Solve the given equation.

$$\frac{\frac{1}{5} - x}{7} = \frac{2x + 9}{3}$$

Exercises

Solve the following equations of rational expressions, if possible.

1. $\frac{2x + 1}{9} = \frac{1 - x}{6}$

2. $\frac{5+2x}{3x-1} = \frac{6}{7}$

3. $\frac{x+9}{12} = \frac{-2x-\frac{1}{2}}{3}$

4. $\frac{8}{3-4x} = \frac{5}{2x+\frac{1}{4}}$

Problem Set

Solve the following equations of rational expressions, if possible. If the equation cannot be solved, explain why.

1. $\frac{5}{6x-2} = \frac{-1}{x+1}$

2. $\frac{4-x}{8} = \frac{7x-1}{3}$

3. $\frac{3x}{x+2} = \frac{5}{9}$

4. $\frac{\frac{1}{2}x + 6}{3} = \frac{x - 3}{2}$

5. $\frac{7 - 2x}{6} = \frac{x - 5}{1}$

6. $\frac{2x+5}{2} = \frac{3x-2}{6}$

7. $\frac{6x+1}{3} = \frac{9-x}{7}$

8. $\frac{\frac{1}{3}x - 8}{12} = \frac{-2 - x}{15}$

9. $\frac{3 - x}{1 - x} = \frac{3}{2}$