Name: _____ Math 7.2, Period _____

Mr. Rogove Date: _____

Learning Objective: We will solve equations with variable expressions in the denominator and rewrite equations as compound equations. (Lesson 93)

Activating Prior Knowledge:

We can solve equations with variables in the denominator.

$\frac{7}{3x+9} = \frac{1}{8}$ $(3x+9)$ $(3x+9)$ $(8)7 = \frac{3x+9}{8}(8)$ $3x+9 = 56$ $-9 \quad -9$ $3x = 47$ $x = 15\frac{2}{3}$ $\{15\frac{2}{3}\}$	$\frac{6}{7x+5} = \frac{1}{9}$ $7x+5 = 54$ $-5 \quad -5$ $7x = 49$ $x = 7$ $\{7\}$

Concept Development:

We should rewrite expressions as compound statements noting any values for the variables that are disallowed.

Examples:

$\frac{5}{x+2}$ has a meaningful value for all values of x, except $x = -2$.

$x+2 \neq 0$

Why? Because $\frac{5}{0}$ would be dividing by zero, and we do not want to do that!

So, $\frac{5}{x+2}$ should be read as a compound statement:

$$\frac{5}{x+2} \text{ and } x+2 \neq 0$$

What is the value of $\frac{3x-6}{x-2}$? What values of x are disallowed?

$x \neq 2$

What are the values of x that are **not** permissible in this expression?

$\frac{10}{x+5}$ $x \neq -5$	$\frac{x^2-25}{(x^2-9)(x+4)}$ $(x-3)(x+3)$ $x \neq -4, 3, -3$

Name: _____ Math 7.2, Period _____

Mr. Rogove Date: _____

GUIDED PRACTICE:

Steps to Solving Equations with Variable Expressions in the Denominator

1. Rewrite the Equation as a System of Equations.
2. Solve the equation and exclude the values of x that lead a denominator of 0.
3. Express your solution in set notation.

$\frac{1}{x} = \frac{3}{x-2}$ $x \neq 0, 2$

$\frac{1}{x} \times \frac{3}{x-2}$ and $x \neq 0, 2$

$3x = x - 2$

$-x \quad -x$

$\frac{2x}{2} = \frac{-2}{2}$ $x = -1$

$\{-1\}$

$\frac{2}{x} \times \frac{3}{x-4}$

$3x = 2(x-4)$ and $x \neq 4, 0$

$3x = 2x - 8$ $\{-8\}$

$-2x \quad -2x$

$x = -8$

$\frac{x+3}{x-2} \times \frac{5}{x-2}$ and $x \neq 2$

$(x+3)(x-2) = 5(x-2)$

$(x+3)(x-2) - 5(x-2) = 0$

$(x-2)[(x+3) - 5] = 0$

$(x-2)(x-2) = 0$

$x - 2 = 0$ or $x - 2 = 0$

$x = 2$ or $x = 2$

Empty Set $\emptyset$ $\{\}$

$\frac{x}{x+6} = -\frac{6}{x+6}$ $x \neq -6$

$\frac{x}{x+6} \times \frac{-6}{x+6}$

$x(x+6) = -6(x+6)$

$+6(x+6) \quad +6(x+6)$

$x(x+6) + 6(x+6) = 0$

$(x+6)(x+6) = 0$ $x = -6$

Empty $\{\}$ $\emptyset$

$\frac{x}{7-x} \times \frac{2x}{1}$ and $x \neq 7$

$2x(7-x) = x$

$14x - 2x^2 = x$

$-x \quad -x$

$13x - 2x^2 = 0$

$x(13 - 2x) = 0$

$x = 0$ or $13 - 2x = 0$

$x = 6.5$

$\{0, 6.5\}$

$\frac{3+x}{3-x} \times \frac{3+2x}{3-2x}$ and $x \neq 3, \frac{3}{2}$

$(3+x)(3-2x) = (3-x)(3+2x)$

$9 - 3x - 2x^2 = 9 + 3x - 2x^2$

$-3x = 3x$

$+3x \quad +3x$

$\frac{0}{6} = \frac{6x}{6}$ $x = 0$

$\{0\}$

Name: _____ Math 7.2, Period _____

Mr. Rogove Date: _____

Independent Practice:

Problem Set from Lesson 18?

Closure:

Write an equation that will have the restriction $x \neq -3, x \neq 14,$ and $x \neq 0$.

Notes:

This maps to Lesson 18 in Alg 1 Mod 1 of ENY.