**Unit 3 Day 5: Solving Rational Equations** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The Multiplicative Identity: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equals \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Ex) 5 ∙ 1 = \_\_\_\_\_\_\_\_\_ $\frac{2}{3}∙1$ = \_\_\_\_\_\_\_\_\_ $\frac{5x}{x+1}∙1=$\_\_\_\_\_\_\_\_\_

Any value divided by itself equals = \_\_\_\_\_\_\_\_\_\_\_\_.

 Ex) $\frac{25}{25} $=\_\_\_\_\_\_\_\_\_ $\frac{3x}{3x}$=\_\_\_\_\_\_\_\_\_\_\_ $\frac{x+6}{x+6}=$\_\_\_\_\_\_\_\_\_\_\_

Therefore, multiplying a term by the same value on the top and the bottom is the same as multiplying by \_\_\_\_\_\_\_\_\_, which means that the value actually stays the same!

This means that we can follow the same rules as we did for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rational expressions when we solve equations because we are not actually changing the value of the equation!

Solve: 

$$\frac{y}{5}∙\frac{ }{ }+\frac{y}{2}∙\frac{ }{ }=\frac{7}{1}∙\frac{ }{ }$$

$$\frac{2y}{10}+\frac{5y}{10}=\frac{70}{10}$$

**How to Solve a Rational Equation (more than one fraction)**

1. Re-write whole numbers as a fraction (put over \_\_\_\_\_)

2. Get \_\_\_\_\_\_\_\_\_\_\_\_ denominators

3. Combined & Simplify \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the denominators

5. Solve & Check

Solve: 

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

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**How to Solve a Rational Equation (one fraction each side)**

1. Re-write whole numbers as a fraction (put over \_\_\_\_\_)

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Set products \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to each other

4. Solve & Check

Why do we have to check our solutions?

**Extraneous solution:** sometimes our answer will occur at a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. In this situation we say the solution is extraneous. Use your calculator check for locations of holes & asymptotes.

**Ex)** Solve the equation below and check for the extraneous solution: $\frac{x}{x-2}+\frac{1}{x-4}=\frac{2}{x^{2}-6x+8}$

**Practice:** Solve each equation below; check for extraneous solutions.

1.  2. $\frac{10}{x+4}=\frac{15}{4x+4}$

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