TOPIC: RATIONAL EQUATIONS

Intro to Rational Expressions

◆ A **rational equation** is an equation with a _____ in the _____ of a fraction.

► We can solve a rational equation by turning it into a _____ equation.

Rational Equation

$$\frac{1}{x-1} = 12$$

◆ Solutions ***CANNOT*** be any value that makes a denominator _____; this is the _____.

EXAMPLE: Solve the rational equation.

$$\frac{x}{x-1} = \frac{7}{6} \qquad x \neq \_\_\_\_$$

SOLVING RATIONAL EQUATIONS

1) Determine _____ by setting denom. = ___

2) Multiply by ___ to eliminate fractions

3) Solve linear equation

4) Check solution with restriction

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PRACTICE Is the following a rational expression or equation?

$(\boldsymbol{A})$

$$\frac{17x+1}{21x-2}$$

[EXPRESSION | EQUATION]

$(\boldsymbol{B})$

$$\frac{3m}{m^2-9}=\frac{11}{2x+13}$$

[EXPRESSION | EQUATION]

PRACTICE Solve the following and check your answer.

$(\boldsymbol{A})$

$$-\frac{3n}{n+2}+\frac{2n}{4n+8}=\frac{6}{8n+16}$$

$(\boldsymbol{B})$

$$\frac{p^2}{p-4}+\frac{4}{4-p}=1$$

EXAMPLE Solve for the given variable in the following equations.

$(\boldsymbol{A})$ Solve for M.

$$A=\frac{M-N}{k}$$

$(\boldsymbol{B})$ Solve for d.

$$\frac{1}{d}=\frac{2}{p}+\frac{3}{q}+k$$

$(\boldsymbol{C})$ Solve for S.

$$V=\frac{xF}{S+xs}$$

TOPIC: RATIONAL EQUATIONS

Solution Equal to Restriction

EXAMPLE: Solve the rational equation.

$$\frac{x-5}{x-2} = \frac{-3}{x-2} + 6 \qquad x \neq \_\_\_\_$$

SOLVING RATIONAL EQUATIONS
1) Determine restriction by setting denom. $= 0$
2) Multiply by LCD to eliminate fractions
3) Solve linear equation
4) Check solution with restriction

◆ If your answer is **equal** to the **restriction**, then there is _____, i.e. solution set = _____.

PRACTICE Solve the equation.

$(\boldsymbol{A})$

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

$(\boldsymbol{B})$

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

$(\boldsymbol{C})$

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