

Solving Rational Equations

27.7

Steps:

- 1) Identify undefined values $x \neq$
- 2) Fraction \pm Fraction = Fraction
 - Multiply each by LCM * Cancel denom!
- 3) Fraction = Fraction
 - Cross Multiply ☺
- 4) Check your answers !!

ex.1

$$x \cdot x + \frac{8 \cdot x}{x} = 6 \cdot x$$

$$x \neq 0 \\ \text{LCM} = x$$

$$x^2 + 8 = 6x$$

$$\begin{array}{r} x^2 - 6x + 8 = 0 \\ (x-2)(x-4) = 0 \end{array}$$

$$\begin{array}{cc} \downarrow & \downarrow \\ x-2=0 & x-4=0 \\ \boxed{x=2} & \boxed{x=4} \end{array}$$

ex.2

$$\frac{10 \cdot 3x}{3} = \frac{4 \cdot 3x}{x} + 2 \cdot 3x$$

$$x \neq 0 \\ \text{LCM} = 3x$$

$$10x = 12 + 6x$$

$$\frac{4x}{4} = \frac{12}{4}$$

$$\frac{10}{3} = \frac{4}{3} + 2$$

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

$$3x = 2x + 3$$

~~-2x~~ ~~-2x~~

$$x = 3$$

$x \neq 3$

- * Denominators are the same!
- * Set numerators =

No Solution

ex. 4

$$\frac{1 \cdot 6(x-1)}{x-1} = \frac{x \cdot 6(x-1)}{x-1} + \frac{x \cdot 6(x-1)}{6}$$

$$6 = 6x + x(x-1)$$

$$6 = 6x + x^2 - x$$

~~-6~~ ~~-6~~

$$0 = x^2 + 5x - 6$$

$$0 = (x+6)(x-1)$$

$x = -6$

$x \neq 1$
LCM: $6(x-1)$

ex. 5

$$\frac{x}{x+1} \rightarrow \frac{x}{x-4}$$

- * $x \neq -1, 4$
- * Cross multiply

$$x(x-4) = x(x+1)$$

$$x^2 - 4x = x^2 + x$$

~~-x^2~~ ~~-x^2~~

~~-4x~~ ~~-x~~