

Solving Rational Equations

- Steps:
- 1.) Identify the undefined variables $x \neq$
 - 2.) Fraction \pm Fraction = Fraction
• Multiply each fraction by LCM *cancel fractions*
 - 3.) Fraction = Fraction
• Cross multiply ☺
 - 4.) Check your answers!!

ex. 1 $x \cdot x + \frac{8}{x} = 6 \cdot x$ $x \neq 0$

$$\begin{aligned}x^2 + 8 &= 6x \\x^2 - 6x + 8 &= 0 \\(x - 2)(x - 4) &= 0 \\x &= 2, 4\end{aligned}$$

LCM: x

$x = 2, 4$

ex. 2 $\frac{10}{3} = \frac{4}{x} + 2$ $x \neq 0$

$$\begin{aligned}10x &= 12 + 6x \\-6x &\quad -6x \\4x &= 12 \\x &= 3\end{aligned}$$

LCM: $3x$

$x = 3$

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

$$\begin{aligned}3x &= 2x + 3 \\-2x &\quad -2x \\x &= 3\end{aligned}$$

Set numerators = same denominator

~~$x = 3$~~

No Solution

ex. 4

$$\frac{1}{x-1} = \frac{x}{x-1} + \frac{x}{6}$$

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

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

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

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

$$x = -6, 1$$

$x = -6$ ✓

ex. 5

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

$x \neq -1, 4$

* Cross Multiply *

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

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

$$-4x = x$$

$$-5x = 0$$

$$-5x = 0$$

$x = 0$ ✓

Extra:

$$\frac{3}{x^2-9} = \frac{12x}{x+3} + 5$$

$$\frac{3}{(x+3)(x-3)} = \frac{12x}{x+3} + 5$$

$x \neq -3, 3$

LCM: $(x+3)(x-3)$

$$3 = 12x^2 - 36x + 5x^2 - 45$$

P. 571 # 21-32 all
 33, 36, 38