

## 6.5 Solving Rational Equations part 1

A rational equation contains at least one rational expression and an "="

ex. 1  $\frac{\cancel{4}^{\textcircled{4}}}{\cancel{12x}^{\textcircled{3}}} + \frac{\cancel{1}^{\textcircled{3}}}{\cancel{4}^{\textcircled{3}}} = \frac{\cancel{3}^{\textcircled{3}}}{\cancel{x}^{\textcircled{3}}}$

$$\begin{array}{r} 20 \\ -20 \end{array} + 3x = 36 \quad \begin{array}{r} \\ -20 \end{array}$$

$$\frac{3x}{3} = \frac{16}{3}$$

$$x = \frac{16}{3}$$

**\* IMPORTANT**

Do non-permiss FIRST

$$x \neq 0$$

L.C.D.

$$12x$$

Mult ALL terms by LCD to eliminate the denom.

2.  $\frac{5 \cdot \cancel{x^2}}{\cancel{x}} + \frac{6 \cdot \cancel{x^2}}{\cancel{x^2}} = 6 \cdot x^2$

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

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

$$0 = \left(x - \frac{3}{2}\right) \left(x + \frac{2}{3}\right)$$

$$0 = \left(x - \frac{3}{2}\right) \left(x + \frac{2}{3}\right)$$

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

$$2x - 3 = 0$$

$$3x + 2 = 0$$

$$x \neq 0$$

$$LCD = x^2$$

Mult ALL terms by LCD

FACTOR  $\begin{matrix} + & -5 \\ \times & -36 \end{matrix}$   
OR  
FORMULA  $-9, 4$

$$\begin{array}{ccc} \downarrow & & \downarrow \\ 2x-3=0 & & 3x+2=0 \\ \hline x=\frac{3}{2} & & x=-\frac{2}{3} \end{array}$$

ex.3

$$\frac{-3}{(x+2)} = \frac{2x}{(x-3)}$$

$x \neq -2, 3$   
 $\rightarrow$  1 expression on each side of the =  
**CROSS MULTIPLY**  
 FACTOR OR  $\begin{matrix} \oplus 7 \\ \otimes -18 \end{matrix}$   
 FORMULA  $-2, 9$

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

$$\begin{array}{r} -3x + 9 \\ +3x \quad -9 \end{array} \rightarrow 2x^2 + 4x + 3x - 9$$

$$0 = 2x^2 + 7x - 9$$

$$0 = (x - \frac{2}{2})(x + \frac{9}{2})$$

$$0 = (x - 1)(2x + 9)$$

$$x = 1, x = -\frac{9}{2}$$

ex.4

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

$x \neq 5, 1$   
 $\rightarrow$  denom.  
**CROSS MULT**

$$(x+2)(x-1) = x(x-5)$$

$$\begin{array}{r} x^2 + x - 2 \\ -x^2 \end{array} = \begin{array}{r} x^2 - 5x \\ -x^2 \end{array}$$

$$x - 2 = -5x$$

$-x$

$$\begin{array}{r} x-2 \\ -x \\ \hline \end{array} = \begin{array}{r} -5x \\ -x \\ \hline \end{array}$$

$$\begin{array}{r} -2 \\ -6 \\ \hline \end{array} = \begin{array}{r} -6x \\ -4 \\ \hline \end{array}$$

$$\boxed{\frac{1}{3} = x}$$

p 581 # 3-7

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