

Adv Alg

9/28 + 9/29 Example

Method 1: convert all fractions to a C.D. → equate numerator

Method 2: multiply through by C.D.

Method 3: Cross multiply

example: $\frac{1}{3} - \frac{1}{x} = \frac{1}{6x}$

possible Extraneous Soln
 $x=0$

Method 3: $\frac{1}{3} - \frac{1}{x} = \frac{1}{6x}$

$$\frac{(1)(x) - (1)(3)}{(3)(x)} = \frac{1}{6x}$$

Cross multiply $\left[\frac{x-3}{3x} = \frac{1}{6x} \right]$
 $(6x)(x-3) = 3x$

notice its a quadratic
So set equal to zero

$$6x^2 - 18x = 3x$$
$$\underline{-3x} \quad \underline{-3x}$$

GCF = 3x

$$6x^2 - 21x = 0$$

$$3x(2x - 7) = 0$$

2PP

$$\frac{3x=0}{3 \quad 3} \quad \frac{2x-7=0}{+7 \quad +7}$$

~~$x=0$~~
extraneous

$$\frac{2x}{2} = \frac{7}{2}$$
$$x = 7/2$$

Method 1: CD \rightarrow equate numerator

$$\frac{1}{3} - \frac{1}{x} = \frac{1}{6x} \quad \text{CD: } 6x$$

$$\frac{2x}{2x} \cdot \frac{1}{3} - \frac{1}{x} \cdot \frac{6}{6} = \frac{1}{6x}$$

equate numerator

$$\left[\begin{array}{l} \frac{2x}{6x} - \frac{6}{6x} = \frac{1}{6x} \\ 2x - 6 = 1 \end{array} \right.$$

$$\begin{array}{r} +6 \quad +6 \\ \hline \hline \end{array}$$

$$\frac{2x}{2} = \frac{7}{2}$$

$$x = 7/2$$

notice we got no extraneous
soln with this method.

Method 2: multiply through by C.D.

$$\frac{1}{3} - \frac{1}{x} = \frac{1}{6x} \quad \text{C.D.: } 6x$$

$$\overset{2x}{\cancel{6x}} \cdot \frac{1}{3} - \frac{1}{\cancel{x}} \cdot \overset{6}{\cancel{6x}} = \frac{1}{\cancel{6x}} \cdot \overset{1}{\cancel{6x}}$$

notice the denominators are eliminated

$$(2x)(1) - (1)(6) = (1)(1)$$

$$\begin{array}{r} 2x - 6 = 1 \\ + 6 \quad + 6 \\ \hline \end{array}$$

$$\cancel{2}x = \frac{7}{\cancel{2}}$$

$$x = 7/2$$

notice we did not get an extraneous soln!



