

8-6A Solving Rational Equations

Example with Fractions

$$\text{LCM} = \frac{12}{1}$$

$$\frac{12}{1} \cdot \frac{5}{6}x + \frac{12}{1} \cdot \frac{2}{3} = \frac{12}{1} \cdot \left(2 - \frac{3}{4}x\right)$$

$$10x + 8 = 24 - 9x$$

$$19x = 16$$

$$x = \frac{16}{19}$$

rational equation: an equation that contains one or more rational expressions.

solving rational equations

- factor every **denominator** and find the **LCD**.
- multiply both sides by the **LCD**. (*eliminate the fractions*)
- solve the equation as usual.
- eliminate any **solutions** that are **excluded values**.

Solve.

$$1. \quad \frac{6}{7} - \frac{3}{x-4} = \frac{7}{8}$$

LCM: $56(x-4)$

$$\frac{\overset{8}{56(x-4)} \cdot \frac{6}{7}}{1} - \frac{\overset{56(x-4)}{56(x-4)} \cdot \frac{3}{x-4}}{1} = \frac{\overset{7}{56(x-4)} \cdot \frac{7}{8}}{1}$$

$$48(x-4) - 168 = 49(x-4)$$

$$48x - 192 - 168 = 49x - 196$$

$$48x - 360 = 49x - 196$$

$$\textcircled{-164 = x}$$

$$-168 = (x-4)$$

Solve.

$$2. \quad \frac{2x}{x+5} - \frac{x^2 - x - 10}{x^2 + 8x + 15} = \frac{3}{x+3}$$

LCM: $(x+3)(x+5)$

$$\frac{\overset{(x+3)(x+5)}{(x+3)(x+5)} \cdot \frac{2x}{x+5}}{1} - \frac{\overset{(x+3)(x+5)}{-1 \cdot (x+3)(x+5)} \cdot \frac{x^2 - x - 10}{(x+3)(x+5)}}{1} = \frac{\overset{(x+3)(x+5)}{(x+3)(x+5)} \cdot \frac{3}{x+3}}{1}$$

$$2x^2 + 6x - x^2 + x + 10 = 3x + 15$$

$$x^2 + 7x + 10 = 3x + 15$$

$$x^2 + 4x - 5 = 0$$

$$(x+5)(x-1) = 0$$

$$x+5=0 \quad \text{or} \quad x-1=0$$

$$\textcircled{x = -5}$$

$$\textcircled{x = 1}$$

{1}

Solve.

$$3. \quad \frac{2}{z+1} - \frac{1}{z-1} = \frac{-2}{z^2-1} \quad \text{LCM: } \frac{(z+1)(z-1)}{1}$$

$$\frac{\cancel{(z+1)}(z-1) \cdot 2}{1 \cdot \cancel{(z+1)}} - \frac{\cancel{(z+1)}(z-1) \cdot 1}{1 \cdot \cancel{(z+1)}} = \frac{\cancel{(z+1)}(z-1) \cdot (-2)}{1 \cdot \cancel{(z+1)}(z-1)}$$

$$2z-2 - z-1 = -2$$

$$z-3 = -2$$

$$\cancel{z-1} \quad \phi$$

If imag $\rightarrow \phi$

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Attachments

9-2HW.notebook