Solving Rational Equations

Key Points:

- A rational equation contains at least one rational expression where the variable appears in at least one of the denominators. In plainer terms, a rational equation is an equation consisting of a fraction of polynomials. For example, $\frac{2}{x} - \frac{3}{2} = \frac{7}{2x}$.

- The steps to solve a rational equation are as follows:

    - Factor all denominators in the equation.
    - Find and exclude values that set each denominator equal to zero.
    - Find the LCD.
    - Multiply the whole equation by the LCD. If the LCD is correct, there will be no denominators left.
    - Solve the remaining equation.
    - Make sure to check solutions back in the original equations to avoid a solution producing zero in a denominator.

Solving Rational Equations Video

- **Solving a Rational Equation -Example 1**
- **Solving a Rational Equation -Example 2**
- **Solving a Rational Equation-Example 3**
- **Solving a Rational Equation -Example 4**
- **Solving a Rational Equation -Example 5**
- **Solving Rational Equation-Example 6**

Practice Exercises

Follow the directions for each exercise below:

1. Solve for x: $\frac{2x}{3} - \frac{3}{4} = \frac{x}{6} + \frac{21}{4}$

2. Solve for x and state all x-values that are excluded from the solution set:

$$\frac{x}{x^2 - 9} + \frac{4}{x + 3} = \frac{3}{x^2 - 9}$$

3. Solve for x and state all x-values that are excluded from the solution set:

$$\frac{1}{2} + \frac{2}{x} = \frac{3}{4}$$

4. Solve for x: $\frac{5}{x+4} = 4 + \frac{3}{x-2}$

Answers:

1. $x = 12$

2. No Solution

3. $x \neq 0, x = 8$

4. $x \neq -4, 2; x = -\frac{5}{2}, 1$