

Section 7.6 Solving Rational Equations

Solving Rational Equations

Follow these steps to solve a rational equation:

1. List restrictions on the variable. Avoid any values of the variable that make a denominator zero.
2. Clear the equation of fractions by multiplying both sides by the LCD of all rational expressions in the equation.
3. Solve the resulting equation.
4. Reject any proposed solution that is in the list of restrictions on the variable. Check other proposed solutions in the original equation.

Example 1: Solve each of the following rational equations.

a. $x + \frac{3}{x} = \frac{19}{x}$

b. $\frac{4}{y} - \frac{y}{2} = \frac{7}{2}$

$$c. \frac{3}{2y-2} + \frac{1}{2} = \frac{2}{y-1}$$

$$d. \frac{x-3}{x-2} + \frac{x+1}{x+3} = \frac{2x^2-15}{x^2+x-6}$$

Applications of Rational Equations:

To Solve Applied Problems Using Rational Equations:

1. Identify the quantity represented by each variable in the rational equation.
2. Plug the known quantities into the equation for the appropriate variables.
3. Solve for the unknown variable.

Example 2: The rational expression $y = \frac{250x}{100 - x}$ models the cost, in millions of dollars, to remove x percent of the pollutants that are discharged into a river.

- a. How much does it cost to remove 50% of the pollutants?
- b. If the government commits \$375 million for this project, what percentage of the pollutants can be removed?

Answers Section 7.6

Example 1:

- a. $\{4, -4\}$
- b. $\{-8, 1\}$
- c. $\{2\}$
- d. $\{4\}$

Example 2:

- a. \$250 million
- b. 60% will be removed