Review of Operations With Fractions

Simplify each of the following: (a) $\frac{4}{5} - \frac{3}{7}$, (b) $\frac{3}{4} - \frac{1}{8}$, and (c) $\frac{1}{6} + \frac{7}{10}$.

Solving Equations Involving Rational Expressions

(Step 1): To solve an equation involving rational expressions, you should start by making a list of excluded values. To do this, you need to find the value(s) of the variable that make the denominator(s) equal zero.

Example: Solve $\frac{1}{x} + \frac{1}{4x-8} = \frac{6}{5x}$ for x.

(Step 1): $x \neq 0$, $4x - 8 \neq 0$, and $5x \neq 0$

$x \neq 0$, $x \neq 2$, and $x \neq 0$

So, if we solve our equation and decide that x could equal either 0 or 2, we must exclude that answer from the solution set.

Solving Equations Involving Rational Expressions

(Step 2): Eliminate the fractions. To do this, you must factor each of the denominators and then multiply each term by the least common denominator (or LCD). Also, you can cancel a factor if it is multiplied by *everything else* on both the top and bottom.

Example: Solve $\frac{1}{x} + \frac{1}{4x-8} = \frac{6}{5x}$ for x.

(Step 2): $\frac{1}{x} + \frac{1}{4(x-2)} = \frac{6}{5x}$

Solving Equations Involving Rational Expressions

(Step 3): Check the answer by substituting the value(s) you found back into the original equation. It is possible that you did all your math correctly, but one or more of the answers you found doesn't work in the original equation.

Example: Solve $\frac{1}{x} + \frac{1}{4x-8} = \frac{6}{5x}$ for x.

Solving Equations Involving Rational Expressions

(Step 1): To solve an equation involving rational expressions, you should start by making a list of excluded values. To do this, you need to find the value(s) of the variable that make the denominator(s) equal zero.

Example: Solve $\frac{x}{x-5} - \frac{35}{x^2-3x-10} = \frac{x+1}{x+2}$ for x.

(Step 1): $x - 5 \neq 0$, $x^2 - 3x - 10 \neq 0$, and $x + 2 \neq 0$

$x \neq 5$, $(x-5)(x+2) \neq 0$, and $x \neq -2$

$x \neq 5$, $x - 5 \neq 0$, $x + 2 \neq 0$, and $x \neq -2$

$x \neq 5$, $x \neq 5$, $x \neq -2$, and $x \neq -2$

So, if we solve our equation and decide that the answer should be either $x = 5$ or $x = -2$, we must exclude that answer from our solution set.

Solving Equations Involving Rational Expressions

(Step 2): Eliminate the fractions. To do this, you must factor each of the denominators and then multiply each term by the least common denominator (or LCD). Also, you can cancel a factor if it is multiplied by *everything else* on both the top and bottom.

Example: Solve $\frac{x}{x-5} - \frac{35}{x^2-3x-10} = \frac{x+1}{x+2}$ for x.

(Step 2): $\frac{x}{x-5} - \frac{35}{(x-5)(x+2)} = \frac{x+1}{x+2}$

Solving Equations Involving Rational Expressions

(Step 3): Check the answer by substituting the value(s) you found back into the original equation. It is possible that you did all your math correctly, but one or more of the answers you found doesn't work in the original equation.

Example: Solve $\frac{x}{x-5} - \frac{35}{x^2-3x-10} = \frac{x+1}{x+2}$ for x.

Solving Equations Involving Rational Expressions

(Step 1): To solve an equation involving rational expressions, you should start by making a list of excluded values. To do this, you need to find the value(s) of the variable that make the denominator(s) equal zero.

Example: Solve $\frac{4+x}{x} - \frac{1}{2} = \frac{10}{x+2}$ for x.

Solving Equations Involving Rational Expressions

(Step 2): Eliminate the fractions. To do this, you must factor each of the denominators and then multiply each term by the least common denominator (or LCD). Also, you can cancel a factor if it is multiplied by *everything else* on both the top and bottom.

Example: Solve $\frac{x+4}{x} - \frac{1}{2} = \frac{10}{x+2}$ for x.

(Step 2): $\frac{x+4}{x} - \frac{1}{2} = \frac{10}{x+2}$

Solving Equations Involving Rational Expressions

(Step 3): Check the answer by substituting the value(s) you found back into the original equation. It is possible that you did all your math correctly, but one or more of the answers you found doesn't work in the original equation.

Example: Solve $\frac{x+4}{x} - \frac{1}{2} = \frac{10}{x+2}$ for x.