

8-6 Solving Rational Equations

Standard

A2.A.REI.A.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. Tasks are limited to square root, cube root, polynomial, rational, and logarithmic functions.

A2.A.REI.A.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

A2.A.REI.D.6 Explain why the x -coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the approximate solutions using technology. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

Objective

Students will solve rational equations

Key Concepts

_____ – an equation that contains at least one rational expression.

Steps to Solve a Rational Equation:

- 1.
- 2.
- 3.
- 4.
- 5.

Examples

1. (I do) What are the solutions of the rational equation?

a. $\frac{2}{3} + \frac{3x-1}{6} = \frac{5}{2}$

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

2. (We do) What are the solutions of the rational equation? $\frac{x-1}{x^2+3x+2} + \frac{2x}{x+2} = \frac{x-1}{x+1}$

3. What are the solutions of the rational equation? Use a graphing calculator. $\frac{2}{x+2} + \frac{x}{x-2} = 1$

4. A flight across the U.S takes longer east to west than it does west to east. Assume the winds are constant in the eastward direction. When flying westward, the headwind decreases the airplane's speed. When flying eastward, the tailwind increases its speed. The time for a 1850 mile round trip is $7\frac{3}{4}$ h. If the airplane cruises at 480 mi/h, what is the speed of the wind? ($d = rt$)

You do: Practice 8-6: Complete your assignment on a separate sheet of paper. Show all work.

1. Solve each equation. Check each solution.

a. $\frac{4}{x-2} = \frac{x-1}{x-2}$

b. $\frac{2a+1}{6} + \frac{a}{2} = \frac{a-1}{3}$

c. $\frac{1}{x} + \frac{x}{2} = \frac{x+4}{2x}$

2. You are riding your bike to a store 4 mi away. When there is no wind, you ride at 10 mi/h. Today your trip took 1 hour. What was the speed of the wind today?