Algebra 2

Ch. 9 Handout 9.6

Solving Rational Equations

Extraneous solutions can be introduced when you multiply both sides of an equation by the same algebraic expression. An **extraneous solution** is a solution of the derived equation, but not of the original equation.

You must check all solutions of the derived equation in the original equation to find whether any of them are not solutions of the original equation.

Solve each equation. Check each solution.

1. $\dfrac{1}{x-3} = \dfrac{6x}{x^2-9}$

LCD = $(x-3)(x+3)$

$\dfrac{(x-3)(x+3)}{1} \cdot \dfrac{1}{(x-3)} = \dfrac{6x}{(x-3)(x+3)} \cdot \dfrac{(x-3)(x+3)}{1}$

$x+3 = 6x$

$-x \quad -x$

$\dfrac{3}{5} = \dfrac{5x}{5}$

$x = \dfrac{3}{5}$

Solve each equation. Check each solution.

2. $\frac{3}{5x} - \frac{4}{3x} = \frac{1}{3}$

LCD = $15x$

$\frac{15x}{1} \cdot \frac{3}{5x} - \frac{15x}{1} \cdot \frac{4}{3x} = \frac{1}{3} \cdot \frac{15x}{1}$

$9 - 20 = 5x$

$-11 = 5x$

$x = \frac{-11}{5}$

Solve each equation. Check each solution.

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

LCD: $(x+3)(x-1)$

$\frac{(x+3)(x-1)}{1}\cdot\frac{x}{(x+3)}+\frac{(x+3)(x-1)}{1}\cdot\frac{1}{(x-1)}=\frac{4}{(x+3)(x-1)}\cdot\frac{(x+3)(x-1)}{1}$

$x(x-1)+(x+3)=4$

$x^2-x+x+3=4$

$x^2+3=4$

$-4\quad -4$

$x^2-1=0$

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

$x-1=0 \quad x+1=0$

$x=1$ $\quad x=-1$

Solve each equation. Check each solution.

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

LCD: $(x-2)(x+1)$

$\frac{(x-2)(x+1)}{1} \cdot \frac{3}{(x+1)} - \frac{(x-2)(x+1)}{1} \cdot \frac{1}{(x-2)} = \frac{1}{(x-2)(x+1)} \cdot \frac{(x-2)(x+1)}{1}$

$3(x-2) - (x+1) = 1$

$3x - 6 - x - 1 = 1$

$2x - 7 = 1$

$2x = 8$

$x = 4$

5. Josephine can row 4 miles upstream in a river in the same time it takes her to row 6 miles downstream. Her rate of rowing in still water is 2 miles per hour. Find the speed of the river current.

	D	R	$T = \frac{D}{R}$
with current (downstream)			
against current upstream			

6. Jim and Alberto have to paint 6000 square feet of hallway in an office building. Alberto works twice as fast as Jim. Working together, they can complete the job in 15 hours. How long would it take each of them working alone?

	time	rate
Alberto		
Jim		
together		

7. Suppose Adrian can weed the garden twice as fast as his son Phillip. Together they can weed the garden in 3 hours. How long would it take each of them working alone?

	time	rate
Adrian		
Phillip		
together		

Assignment:

Day 1: pg 524 1-21 odds, 27-31 odds, 39-43 odds