

Solving Rational Equations Day 2 Notes

Solve the following rational equations. Do not forget to check for extraneous solutions. Give exact answers.

1. $\frac{8x-3}{5x-9} = 0$

$$\begin{array}{r} 8x-3=0 \\ +3 \quad +3 \\ \hline 8x=3 \\ \frac{8x}{8} = \frac{3}{8} \end{array}$$

$x = \frac{3}{8}$

2. $\frac{x-4}{x+3} = 7$

4. $\frac{x^2-11x+28}{x+3} = 0$

$$\begin{aligned} x^2-11x+28 &= 0 \\ (x-7)(x-4) &= 0 \end{aligned}$$

$x = 7, 4$

~~$\frac{28}{-7} = -4$~~

3. $\frac{7x}{x+1} = \frac{5x}{2}$

$$\begin{array}{r} 14x = 5x^2 + 5x \\ -14x \quad -14x \\ \hline 0 = 5x^2 - 9x \\ 0 = x(5x-9) \end{array}$$

$x = 0$

$5x-9=0$
 $+9 \quad +9$

$\frac{5x}{5} = \frac{9}{5}$

$x = \frac{9}{5}$

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

$x - 24 = 12$

$+24 \quad +24$

$x = 36$

6. $\frac{1}{x-3} + \frac{1}{x+3} = \frac{10}{x^2-9}$

$$\frac{1}{\cancel{(x-3)}(x+3)} + \frac{1}{\cancel{(x-3)}(x+3)} = \frac{10}{\cancel{(x-3)}(x+3)}$$

$x+3 + x-3 = 10$

$\frac{2x}{2} = \frac{10}{2}$

$x = 5$

7. $\frac{x}{x} = \frac{1}{1} = 1$

$x^2 - 3 = 2x$

$-2x \quad -2x$

$x^2 - 2x - 3 = 0$

$(x-3)(x+1) = 0$

$x = 3, -1$

~~$\frac{-3}{-3} = 1$~~
 ~~$\frac{-3}{-2}$~~

8. $\frac{9}{x+2} = \frac{3}{x+2} + \frac{2x}{1}(x+2)$

$9 = 3 + 2x^2 + 4x$

$-9 \quad -9$

$0 = 2x^2 + 4x - 6$

$0 = 2(x^2 + 2x - 3)$

$0 = 2(x+3)(x-1)$

$x = -3, 1$

~~$\frac{-3}{2}$~~

9. $\frac{2x}{x+3} - \frac{x}{x+7} = \frac{x^2-1}{x^2+10x+21}$

$$\frac{2x}{\cancel{(x+3)}(x+7)} - \frac{x}{\cancel{(x+3)}(x+7)} = \frac{x^2-1}{\cancel{(x+3)}(x+7)}$$

$2x^2 + 14x - x^2 - 3x = x^2 - 1$

$x^2 + 11x = x^2 - 1$

$11x = -1$

$x = -\frac{1}{11}$