

Name:

Date:

Period:

7.6 Solving Rational Equations notes & practice

Solving Rational Equations	METHOD 1:	METHOD 2:
	Condense into a <i>proportion</i> if not currently. Then, cross-multiply to solve.	Multiply both sides of the equation by the <i>least common denominator</i> LCD to clear out the fractions. Solve.
	CHECK YOUR SOLUTIONS!	Extraneous

Directions: Solve each equation. Check your solutions

1. $\frac{7}{x-6} = \frac{4}{x} \quad x \neq 6, 0$

$$\begin{aligned} 7x &= 4(x-6) \\ 7x &= 4x - 24 \\ 3x &= -24 \\ x &= -8 \end{aligned}$$

check

$$\frac{7}{-8-6} \stackrel{?}{=} \frac{4}{-8}$$

$$\frac{7}{-4} = \frac{4}{-8}$$

$$-\frac{7}{4} = -\frac{1}{2} \checkmark$$

2. $\frac{3}{x-8} = \frac{7}{2x+1}$

$$\begin{aligned} 3(2x+1) &= 7(x-8) \\ 6x+3 &= 7x-56 \\ -x &= -59 \\ x &= 59 \end{aligned}$$

check

$$\frac{3}{59-8} \stackrel{?}{=} \frac{7}{2(59)+1}$$

$$\frac{3}{51} = \frac{7}{118+1}$$

$$\frac{1}{17} = \frac{7}{119}$$

$$\frac{1}{17} = \frac{1}{17} \checkmark$$

3. $\frac{13}{3w-3} - \frac{1}{w-1} = \frac{w}{9}$ Method 1

LCD left side: $3(w-1)$

$$\frac{13}{3(w-1)} - \frac{1 \cdot 3}{(w-1)3}$$

$$\frac{10}{3(w-1)} = \frac{w}{9}$$

$$\begin{aligned} 10 \cdot 9 &= 3w(w-1) \\ 90 &= 3w^2 - 3w \\ 3w^2 - 3w - 90 &= 0 \\ 3(w^2 - w - 30) &= 0 \\ 3(w-6)(w+5) &= 0 \end{aligned}$$

w = 6, -5

check

$$\frac{13}{3(6)-3} - \frac{1}{6-1} \stackrel{?}{=} \frac{6}{9}$$

$$\frac{13}{15} - \frac{1}{5} = \frac{2}{3}$$

$$\frac{13-3}{15} = \frac{2}{3}$$

$$\frac{10}{15} = \frac{2}{3}$$

$$\frac{2}{3} = \frac{2}{3} \checkmark$$

$$\frac{13}{3(-5)-3} - \frac{1}{-5-1} \stackrel{?}{=} \frac{-5}{9}$$

$$\frac{13}{-18} - \frac{1}{-6}$$

$$\frac{13}{-18} + \frac{3}{18}$$

$$\frac{-10}{18} =$$

$$-\frac{5}{9} = -\frac{5}{9} \checkmark$$

4. $\frac{13}{3w-3} - \frac{1}{w-1} = \frac{w}{9}$ Method 2

LCD of all Denom. $3(w-1)$

$$9(w-1) \cdot \frac{13}{3(w-1)} - 9(w-1) \cdot \frac{1}{w-1} = 9(w-1) \cdot \frac{w}{9}$$

$$\begin{aligned} 13 \cdot 3 - 9 &= w(w-1) \\ 39 - 9 &= w^2 - w \\ 30 &= w^2 - w \\ w^2 - w - 30 &= 0 \\ (w-6)(w+5) &= 0 \end{aligned}$$

w = 6, -5

3/4

$$5. \frac{m+3}{3} = \frac{8}{m-2}$$

$$m = -6, 5$$

$$6. \frac{r}{r-1} = \frac{4}{r}$$

$$r = 2$$

$$7. \frac{y}{3} = \frac{y+8}{y+5}$$

$$y = -6, 4$$

$$8. \frac{2x-3}{2} = \frac{3}{x+4}$$

$$x = -\frac{9}{2}, 2$$

$$9. \frac{4}{3} - \frac{7}{n} = \frac{1}{6}$$

$$n = 6$$

NOTES

$$10. \frac{3}{k} - \frac{1}{2} = \frac{12}{k} \quad \text{notes} \quad k \neq 0$$

LED: $2k$

$$2k \cdot \frac{3}{k} - 2k \cdot \frac{1}{2} = 2k \cdot \frac{12}{k}$$

$$6 - k = 24$$

$$-k = 18$$

$$k = -18$$

Check

$$\frac{3}{-18} - \frac{1}{2} = \frac{12}{-18}$$

$$\frac{-1}{6} - \frac{3}{6} = \frac{-2}{3}$$

$$\frac{-4}{6} = \frac{-2}{3} \quad \checkmark$$

or

$$\frac{6-k}{2k} = \frac{12}{k}$$

$$k=0 \quad k=-18$$

$$\frac{6-k}{2(0)} = \frac{12}{0}$$

$$k=0$$

extraneous

It is an excl. value

$$k(6-k) = 24k$$

$$6k - k^2 = 24k$$

$$0 = k^2 + 18k$$

$$0 = k(k+18)$$

$$11. \frac{p}{p-2} + 2 = \frac{0}{p^2-4}$$

$$p = -\frac{2}{3}$$

$$12. \frac{c^2-4c}{c(c-4)} = \frac{c}{c-4} - 1 \quad c(c-4)$$

$$c(c-4) \cdot \frac{3c-2}{c(c-4)} = c(c-4) \cdot \frac{c}{c-4} - c(c-4) \cdot 1$$

$$3c-2 = c \cdot c - c(c-4)$$

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

$$3c-2 = 4c$$

$$-2 = c$$

$$\text{check} \quad \frac{3(-2)-2}{(-2)^2-4(-2)} = \frac{-2}{-2-4} - 1$$

$$\frac{-8}{12} = \frac{2}{6} - 1 \rightarrow \frac{-2}{3} = \frac{-2}{3} \checkmark$$

$$13. \frac{x+6}{x+3} = 2 - \frac{5x+12}{x+3}$$

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