

# Lesson 8: HW ODDS

## How to solve RATIONAL EQUATIONS

There are a couple methods for solving rational equations. One of the methods is described below.

- 1 Set the equation up as a proportion.  $\left(\frac{a}{b} = \frac{c}{d}\right)$
- 2 Cross-Multiply ( $ad = bc$ ) ✓
- 3 Solve the remaining equation.
- 4 Check for **extraneous solutions**. *when factors cancel*

Directions: Solve each equation below.

**EXAMPLES**

$\frac{300}{4} = \frac{x}{100}$   
 $300 = \frac{4x}{100}$   
 $75 = x$

$\frac{3}{4} = \frac{x}{9}$   
 $27 = 4x$   
 $6.75 = x$

Goal  $ax^2 + bx + c = 0$

1.  $\frac{18}{x-1} = \frac{6}{x+3}$  ( $x=1$ )  
 $18(x+3) = 6(x-1)$   
 $18x + 54 = 6x - 6$   
 $-6x - 54 = -6x - 54$   
 $12x = -60$  ( $x = -5$ )

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

3.  $\frac{4a}{6} = \frac{a-3}{4}$   
 $4a = \frac{6(a-3)}{4}$   
 $4a = 6a - 18$   
 $-2a = -18$  ( $a = 9$ )

4.  $\frac{5}{2} = \frac{k-8}{k-2}$

5.  $\frac{w+7}{w+3} = \frac{5}{w+7}$   
 $w^2 + 7w = 5w + 15$   
 $-5w - 5w - 15$   
 $w^2 + 2w - 15 = 0$   
 $(w+5)(w-3) = 0$   
 $w = -5, 3$

6.  $\frac{4}{r} = \frac{r-8}{5}$

7.  $\frac{x+1}{x} = \frac{-7}{x-12}$

8.  $\frac{c+2}{6} = \frac{3}{c-1}$

9.  $\frac{15}{k^2-1} = \frac{5}{2k-2}$  ( $k^2=1$ )  
 $30k - 30 = 5k^2 - 5$   
 $-30k + 30 = -30k + 30$   
 $0 = 5k^2 - 30k + 25$   
 $5(k^2 - 6k + 5)$   
 $5(k-5)(k-1) = 0$   
 $k = 5, 1$

10.  $\frac{p-3}{2} = \frac{2p+5}{3p}$

11.  $\frac{3y-4}{y-5} = \frac{y-2}{y+2}$

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

Creating a  
**PROPORTION**

For the following problems, you will need to combine one side of the equation in order to create a proportion!

13.  $\frac{7x}{9} + \frac{1}{3} = \frac{x-1}{2}$

$$2(7x+3) = (x-1)9$$

$$14x + 6 = 9x - 9$$

$$5x = -15$$

$$x = -3$$

14.  $\frac{w-3}{3} + \frac{w}{2} = \frac{w+4}{2}$

15.  $\frac{2n-1}{6} - \frac{n}{3} = \frac{n+4}{18}$

16.  $\frac{3h}{2} - \frac{1}{4} = \frac{10h}{8}$

17.  $\frac{g}{g+2} - \frac{2}{g+2} = \frac{5}{g+4}$

18.  $\frac{y}{2} - \frac{y}{8} = \frac{2}{3y}$

Quadratic!  
try to  
factor

19.  $\frac{1}{4} + \frac{1}{4a} = \frac{3}{2a}$

$$2a(a+1) = 3(4a)$$

$$2a^2 + 2a = 12a$$

$$(2a^2 - 10a) = 0$$

$$2a(a-5) = 0?$$

$$a = 0, 5$$

20.  $\frac{11}{4x-4} - \frac{2}{x-1} = \frac{x}{8}$

Name: \_\_\_\_\_

Unit 10: Rational Expressions

Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 8: Rational Equations

**\*\* This is a 2-page document! \*\***

ODDS

**Directions:** Solve each rational equation.

1.  $\frac{x-2}{14} = \frac{2}{7}$

2.  $\frac{p}{4} = \frac{p+5}{9}$

3.  $\frac{5}{k-8} = \frac{2}{k+1}$

$5k + 5 = 2k - 16$   
 $-2k - 5 = -2k - 5$   
 $3k = -21$   
 $\frac{3k}{3} = \frac{-21}{3}$

$k = -7$

4.  $\frac{r}{12} = \frac{2}{r-5}$

5.  $\frac{4}{y-8} = \frac{y}{y-5}$

6.  $\frac{a-3}{2} = \frac{3a-7}{a+3}$

7.  $\frac{5}{-2n} = \frac{9n}{10}$  quad = 0  
 $50 = 18n^2 - 50 = 0$   
 $2(9n^2 - 25) \leftarrow$  perfect square  
 $2(3n+5)(3n-5) = 0$

$\frac{-5}{3}$

8.  $\frac{8c+13}{3} = \frac{c-1}{c}$

9.  $\frac{7}{12v} + \frac{1}{6v} = \frac{1}{v-1}$

10.  $\frac{2}{m+3} - \frac{8}{5m+15} = \frac{m}{10}$

11.  $\frac{2z}{9} + \frac{1}{3} = \frac{2}{z+4}$

12.  $\frac{7p}{4p-8} - \frac{p}{p-2} = \frac{p}{p-5}$

13.  $\frac{2}{r+9} = \frac{r+1}{2r-3} + \frac{9-16r}{4r^2-9}$

*Handwritten work:*

$\frac{2(2r+3)(r+1)}{(2r+3)(2r-3)} + \frac{9-16r}{(2r+3)(2r-3)}$

$\frac{2r^2+5r+3+9-16r}{(2r+3)(2r-3)} = \frac{2r^2-11r+12}{(2r+3)(2r-3)}$

$\frac{(2r+3) \cdot 2 \cdot (r-4)(r+9)}{(2r+3)(2r-3)} = \frac{(2r-3)(r-4)}{(2r-3)(2r+3)}$

$\frac{4r+6}{r-6} = \frac{r^2-4r-36}{r^2+r-42}$

$(r+7)(r-6) = 0$

$r = -7, 6$

14. If the area of the of the rectangle below is 126 square meters, find the value of x.

