

2-3 HW Answer Key

1. $(a - b)$

2. $\frac{21}{10(x+3)}$

3. $\frac{(x-6)}{x(x+6)}$

4. $\frac{-4}{(x-4)(x+4)}$

5. $\frac{b^2 - a^2}{ab(x+y)}$

6. $\frac{x^2 + 3x - 12}{(x-3)(x+4)(x+6)}$

7. $\frac{x^2 + 2xw - w^2}{w^2x^2}$

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

Alg 2 Homework 2-3

Name key (2016)Add or subtract. Simplify if possible. Assume all fractions are defined

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

$$= \frac{(a+b)(a-b)}{a+b}$$

$$= \boxed{a-b}$$

$$2. \frac{5}{2x+6} - \frac{2}{5x+15}$$

$$\left(\frac{5}{5}\right) \frac{5}{2(x+3)} - \frac{2}{5(x+3)} \left(\frac{2}{2}\right)$$

$$\frac{25}{10(x+3)} - \frac{4}{10(x+3)} = \boxed{\frac{21}{10(x+3)}}$$

$$3. \frac{x}{x^2+9x+18} - \frac{3}{x^2+3x}$$

$$\left(\frac{x}{x}\right) \frac{x}{(x+6)(x+3)} - \frac{3}{x(x+3)} \left(\frac{x+6}{x+6}\right)$$

$$\frac{x^2}{x(x+6)(x+3)} - \frac{3x+18}{x(x+6)(x+3)}$$

$$\frac{x^2 - 3x - 18}{x(x+6)(x+3)} = \frac{(x-6)(x+3)}{x(x+6)(x+3)}$$

$$= \boxed{\frac{x-6}{x(x+6)}}$$

$$4. \frac{x}{x^2-16} - \frac{1}{x-4}$$

$$\frac{x}{(x+4)(x-4)} - \frac{1}{x-4} \left(\frac{x+4}{x+4}\right)$$

$$\frac{x}{(x+4)(x-4)} - \frac{x+4}{(x-4)(x+4)}$$

$$\boxed{\frac{-4}{(x+4)(x-4)}}$$

$$5. \frac{a+b}{ax+ay} - \frac{a+b}{bx+by}$$

$$\begin{aligned} & \left(\frac{b}{b}\right) \frac{a+b}{a(x+y)} - \frac{a+b}{b(x+y)} \left(\frac{a}{a}\right) \\ & \frac{ab+b^2}{ab(x+y)} - \frac{a^2+ab}{ab(x+y)} \\ & \boxed{\frac{b^2-a^2}{ab(x+y)}} \end{aligned}$$

$$6. \frac{x}{x^2+x-12} - \frac{3}{x^2+3x-18}$$

$$\begin{aligned} & \left(\frac{x+6}{x+6}\right) \frac{x}{(x+4)(x-3)} - \frac{3}{(x+6)(x-3)} \left(\frac{x+4}{x+4}\right) \\ & \frac{x^2+6x}{(x+6)(x+4)(x-3)} - \frac{3x+12}{(x+6)(x-3)(x+4)} \\ & \boxed{\frac{x^2+3x-12}{(x+6)(x+4)(x-3)}} \end{aligned}$$

$$7. \frac{w+x}{w^2x} + \frac{x-w}{wx^2}$$

$$\begin{aligned} & \left(\frac{x}{x}\right) \frac{w+x}{w^2x} + \frac{x-w}{wx^2} \left(\frac{w}{w}\right) \\ & \frac{xw+x^2}{x^2w^2} + \frac{xw-w^2}{w^2x^2} \\ & \boxed{\frac{x^2+2xw-w^2}{x^2w^2}} \end{aligned}$$

$$8. \frac{1}{x-1} - 2$$

$$\begin{aligned} & \frac{1}{x-1} - \frac{2}{1} \left(\frac{x-1}{x-1}\right) \\ & \frac{1}{x-1} - \frac{2x-2}{x-1} \\ & \boxed{\frac{-2x+3}{x-1} \text{ or } \frac{3-2x}{x-1}} \end{aligned}$$

Rational Equations

Algebra 2 Unit 2 Day 4

Solving Rational Equations

Proportions (fraction = fraction)

- State domain restrictions
- Cross multiply (parenthesis around binomials!)
- Solve for x
- Check** for extraneous roots (see domain restrictions)

Solve:

1.

$$\frac{3}{x+2} = \frac{7}{8} \quad x \neq -2$$

$$7x + 14 = 24$$

$$\frac{7x}{7} = \frac{10}{7}$$

$$x = \frac{10}{7}$$

$$\left\{ \frac{10}{7} \right\}$$

2.

$$\frac{2n}{n+6} = \frac{3}{n-3} \quad n \neq -6, 3$$

$$2n(n-3) = 3(n+6)$$

$$2n^2 - 6n = 3n + 18$$

$$2n^2 - 9n - 18 = 0$$

$$2n^2 - 12n + 3n - 18 = 0$$

$$2n(n-6) + 3(n-6) = 0$$

$$(n-6)(2n+3) = 0$$

$$\frac{n-6=0}{n=6} \quad \frac{2n+3=0}{n=-3/2}$$

$$\left\{ 6, -\frac{3}{2} \right\}$$

$$P = -36$$

$$S = -9$$

$$-12, 3$$

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

$$4. \quad \frac{16}{x^2-16} = \frac{2}{x-4} \quad x \neq \pm 4$$

$$2(x^2-16) = 16(x-4)$$

$$2x^2 - 32 = 16x - 64$$

$$\frac{2x^2 - 16x + 32}{2} = \frac{0}{2}$$

$$x^2 - 8x + 16 = 0$$

$$(x-4)(x-4) = 0$$

$$x-4=0$$

$$\underline{x=4} \text{ Reject}$$

$$\mathbb{R} \text{ or } \emptyset$$

Fractional Equations

- State domain restrictions
- Multiply each term by $\frac{LCD}{1}$ to eliminate denominators.
- Solve the resulting equation (usually linear or quadratic)
- Check** for extraneous roots (see domain restrictions)

Solve.

5. $x \left(x - \frac{18}{x} \right) = 3x \quad x \neq 0$

$$x(x) - \cancel{x} \left(\frac{18}{\cancel{x}} \right) = 3x$$

$$x^2 - 18 = 3x$$

$$x^2 - 3x - 18 = 0$$

$$(x-6)(x+3) = 0$$

$$x=6 \mid x=-3$$

$$\{6, -3\}$$

6. $\frac{4}{x^2} - 10 = \frac{3}{x} \quad x \neq 0$

$$\cancel{x^2} \left(\frac{4}{\cancel{x^2}} \right) - x^2(10) = x^2 \left(\frac{3}{\cancel{x}} \right)$$

$$4 - 10x^2 = 3x$$

$$0 = 10x^2 + 3x - 4$$

$$0 = (2x-1)(5x+4)$$

$$2x-1=0 \mid 5x+4=0$$

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

$$\left\{ \frac{1}{2}, -\frac{4}{5} \right\}$$

$$7. \quad 1 + \frac{5}{x-5} = \frac{2x-5}{x-5} \quad x \neq 5$$

$$(x-5) \cdot 1 + \cancel{(x-5)} \left(\frac{5}{\cancel{x-5}} \right) = \cancel{(x-5)} \left(\frac{2x-5}{\cancel{x-5}} \right)$$

$$\begin{aligned} x - 5 + 5 &= 2x - 5 \\ -x &= -5 \\ \cancel{x} = 5 &\text{ Reject} \\ \{ \} &\text{ or } \emptyset \end{aligned}$$

$$8. \quad \frac{x}{4} + \frac{5x-20}{4x} = \frac{1}{x} \quad x \neq 0$$

$$\cancel{4x} \left(\frac{x}{\cancel{4}} \right) + \cancel{4x} \left(\frac{5x-20}{\cancel{4x}} \right) = \cancel{4x} \left(\frac{1}{\cancel{x}} \right)$$

$$\begin{aligned} x^2 + 5x - 20 &= 4 \\ x^2 + 5x - 24 &= 0 \\ (x+8)(x-3) &= 0 \\ \hline x = -8 & \mid x = 3 \\ \{ -8, 3 \} \end{aligned}$$

Discuss with partner and write a response in your own words:

- a) What is an extraneous root?
- b) When might you have an extraneous root?