

2-4 HW Answer Key

1. $\frac{16x-9}{4(3x+1)}, x \neq -\frac{1}{3}$

2. $\frac{-1}{x-4}, x \neq \pm 4$

3. 7

4. $-\frac{6}{5}$

5. -3

6. $\frac{4}{5}$

7. -1

8. 6

9. -3

10. -1 and 4

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Alg 2 Homework 2-4

Name key (2016)Add or subtract. Identify any x-values for when the expression is undefined.

1. $\frac{4x-5}{12x+4} + \frac{3x-1}{3x+1}$

$$\frac{4x-5}{4(3x+1)} + \frac{3x-1}{3x+1} \left(\frac{4}{4}\right)$$

$$\frac{4x-5}{4(3x+1)} + \frac{12x-4}{4(3x+1)}$$

$$\boxed{\frac{16x-9}{4(3x+1)}} \quad x \neq -\frac{1}{3}$$

Solve and check for extraneous roots:

2. $\frac{2x+8}{x^2-16} - \frac{3}{x-4}$

$x \neq \pm 4$

$$\frac{2x+8}{(x+4)(x-4)} - \frac{3}{x-4} \left(\frac{x+4}{x+4}\right)$$

$$\frac{2x+8}{(x+4)(x-4)} - \frac{3x+12}{(x-4)(x+4)}$$

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

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

$6x+18=60$

$6x=42$

$x=7$

$\{7\}$

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

$x \neq 0, 2$

$3(x-2) = 8x$

$3x-6 = 8x$

$-6 = 5x$

$-\frac{6}{5} = x$

$\{-\frac{6}{5}\}$

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$$\begin{aligned} \frac{x^2-1}{x-3} &= \frac{8}{x-3} \quad x \neq 3 \\ x^2-1 &= 8 \quad x \neq 3 \\ x^2-9 &= 0 \\ (x+3)(x-3) &= 0 \\ x+3=0 & \quad x-3=0 \\ x=-3 & \quad x=3 \\ x=-3 & \quad \text{reject} \\ \{ -3 \} \end{aligned}$$

$$\begin{aligned} 6. \quad \frac{6}{3x} + \frac{5}{4} &= \frac{3}{x} \quad x \neq 0 \\ \frac{12x}{1} \cdot \frac{6}{3x} + \frac{12x}{1} \cdot \frac{5}{4} &= \frac{12x}{1} \cdot \frac{3}{x} \\ 24 + 15x &= 36 \\ 15x &= 12 \\ x &= \frac{12}{15} = \frac{4}{5} \\ \{ \frac{4}{5} \} \end{aligned}$$

$$\begin{aligned} 7. \quad \frac{x+3}{\frac{3x+6}{x+2}} + \frac{4}{x+2} &= \frac{14}{3} \quad x \neq -2 \\ \frac{3(x+2)}{1} \cdot \frac{x+3}{3(x+2)} + \frac{3(x+2)}{1} \cdot \frac{4}{x+2} &= \frac{14}{3} \cdot \frac{3(x+2)}{1} \\ x+3 + 12 &= 14(x+2) \\ x+15 &= 14x+28 \\ -13 &= 13x \\ -1 &= x \\ \{ -1 \} \end{aligned}$$

$$\begin{aligned} 8. \quad \frac{1}{2} + \frac{2}{x} &= \frac{3}{x} + \frac{1}{3} \quad x \neq 0 \\ \frac{6x}{1} \cdot \frac{1}{2} + \frac{6x}{1} \cdot \frac{2}{x} &= \frac{6x}{1} \cdot \frac{3}{x} + \frac{6x}{1} \cdot \frac{1}{3} \\ 3x + 12 &= 18 + 2x \\ x &= 6 \\ \{ 6 \} \end{aligned}$$

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$$\begin{aligned} 9. \quad \frac{x}{x-2} + \frac{x}{\frac{x^2-4}{x+2}} &= \frac{x+3}{x+2} \quad x \neq \pm 2 \\ \frac{(x+2)(x-2)}{1} \cdot \frac{x}{x-2} + \frac{(x+2)(x-2)}{1} \cdot \frac{x}{(x+2)(x-2)} &= \frac{(x+2)(x-2)}{1} \cdot \frac{x+3}{x+2} \\ x(x+2) + x &= (x-2)(x+3) \\ x^2+2x+x &= x^2+3x-2x-6 \\ 3x &= x-6 \\ 2x &= -6 \\ x &= -3 \quad \{ -3 \} \end{aligned}$$

$$\begin{aligned} 10. \quad \frac{12}{x+1} - \frac{8}{x} &= \frac{2}{1} \cdot \frac{x(x-1)}{1} \quad x \neq 0, 1 \\ 12x - 8(x-1) &= 2x(x-1) \\ 12x - 8x + 8 &= 2x^2 - 2x \\ 0 &= 2x^2 - 6x - 8 \\ 0 &= x^2 - 3x - 4 \\ 0 &= (x-4)(x+1) \\ \begin{array}{c|c} x-4=0 & x+1=0 \\ x=4 & x=-1 \end{array} & \quad \{ -1, 4 \} \end{aligned}$$

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

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

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Rational Expressions

Algebra 2 Unit 2 Day 5

Warm-Up

$a \neq 0$

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

$$\frac{2}{a} \left(\frac{2a}{1} \right) = \frac{4}{1} \left(\frac{2a}{1} \right) + \frac{4}{2a} \left(\frac{2a}{1} \right)$$

$$\frac{4}{1} = 8a + \frac{4}{1}$$

$$\frac{0}{8} = \frac{8a}{8} \quad a = 0$$

No Solution

2. $\frac{x+4}{x} + \frac{3}{x-4} = \frac{-16}{x^2-4x}$ LCD $x(x-4)$
 $x \neq 0, 4$

$$\left(\frac{x(x-4)}{1} \cdot \frac{x+4}{x} \right) + \left(\frac{x(x-4)}{1} \cdot \frac{3}{x-4} \right) = \left(\frac{x(x-4)}{1} \cdot \frac{-16}{x(x-4)} \right)$$

$$(x-4)(x+4) + 3x = -16$$

$$x^2 - 16 + 3x = -16$$

$$\begin{array}{r} +16 \\ x^2 - 16 + 3x = -16 \\ \hline \end{array} \quad \begin{array}{r} +16 \\ \hline \end{array}$$

$$x^2 + 3x = 0$$

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

$$\begin{array}{l|l} x = 0 & x+3 = 0 \\ \text{reject} & x = -3 \end{array}$$

{-3}

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Complex Fractions

Def → A complex fraction is a fraction in which the numerator or denominator contain one or more fractions or negative exponents.

- ❖ To simplify means to write it as a fraction in lowest terms with no fractions in the numerator or denominator.
- ❖ In order to simplify a complex fraction, multiply the numerator and denominator by the LCD of all the fractions. (Think, "How can I multiply to get rid of these denominators?")
- ❖ Note: Remember to distribute the LCD when you have a binomial numerator or denominator.

Multiply by LCD

Simplify

1. $\frac{\frac{2x}{1} \cdot \frac{1}{x}}{\frac{1}{1} - \frac{1}{2x}}$ LCD: $2x$

$$= \frac{\boxed{x^2} + \boxed{2}}{\boxed{1}}$$

$$= \underline{x^2 + 2}$$

2. $\frac{1 - \frac{1}{x}}{\frac{1}{1} - \frac{1}{x^2}}$ LCD: x^2

$$= \frac{\left(\frac{x^2}{1} \cdot \frac{1}{1}\right) - \left(\frac{x^2}{1} \cdot \frac{1}{x}\right)}{\left(\frac{x^2}{1} \cdot \frac{1}{1}\right) - \left(\frac{x^2}{1} \cdot \frac{1}{x^2}\right)}$$

$$= \frac{\boxed{x^2} - \boxed{x}}{\boxed{x^2} - \boxed{1}}$$

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

$$= \frac{x}{x+1}$$

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3. $\frac{\frac{x^2}{1} \cdot \frac{1}{y}}{\frac{1}{y^2} - \frac{1}{x^2}}$ LCD: x^2y^2

$$= \frac{\boxed{xy^2} - \boxed{x^2y}}{\boxed{y^2} - \boxed{x^2}}$$

$$= \frac{xy(y-x)}{(y-x)(y+x)}$$

$$= \frac{xy}{y+x}$$

4. $\frac{4 - \frac{1}{y^2}}{\frac{2}{y} - \frac{1}{y^2}}$ LCD: y^2

$$= \frac{\left(\frac{y^2}{1} \cdot \frac{4}{1}\right) - \left(\frac{y^2}{1} \cdot \frac{1}{y^2}\right)}{\left(\frac{y^2}{1} \cdot \frac{2}{y}\right) - \left(\frac{y^2}{1} \cdot \frac{1}{y^2}\right)}$$

$$= \frac{\boxed{4y^2} - \boxed{1}}{\boxed{2y} - \boxed{1}}$$

$$= \frac{(2y-1)(2y+1)}{(2y-1)} = \underline{2y+1}$$

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

6.
$$\frac{\frac{y}{x} - 1}{\frac{1}{x} - \frac{1}{y}}$$

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Discuss with partner and write a response:

a) What is a complex fraction?

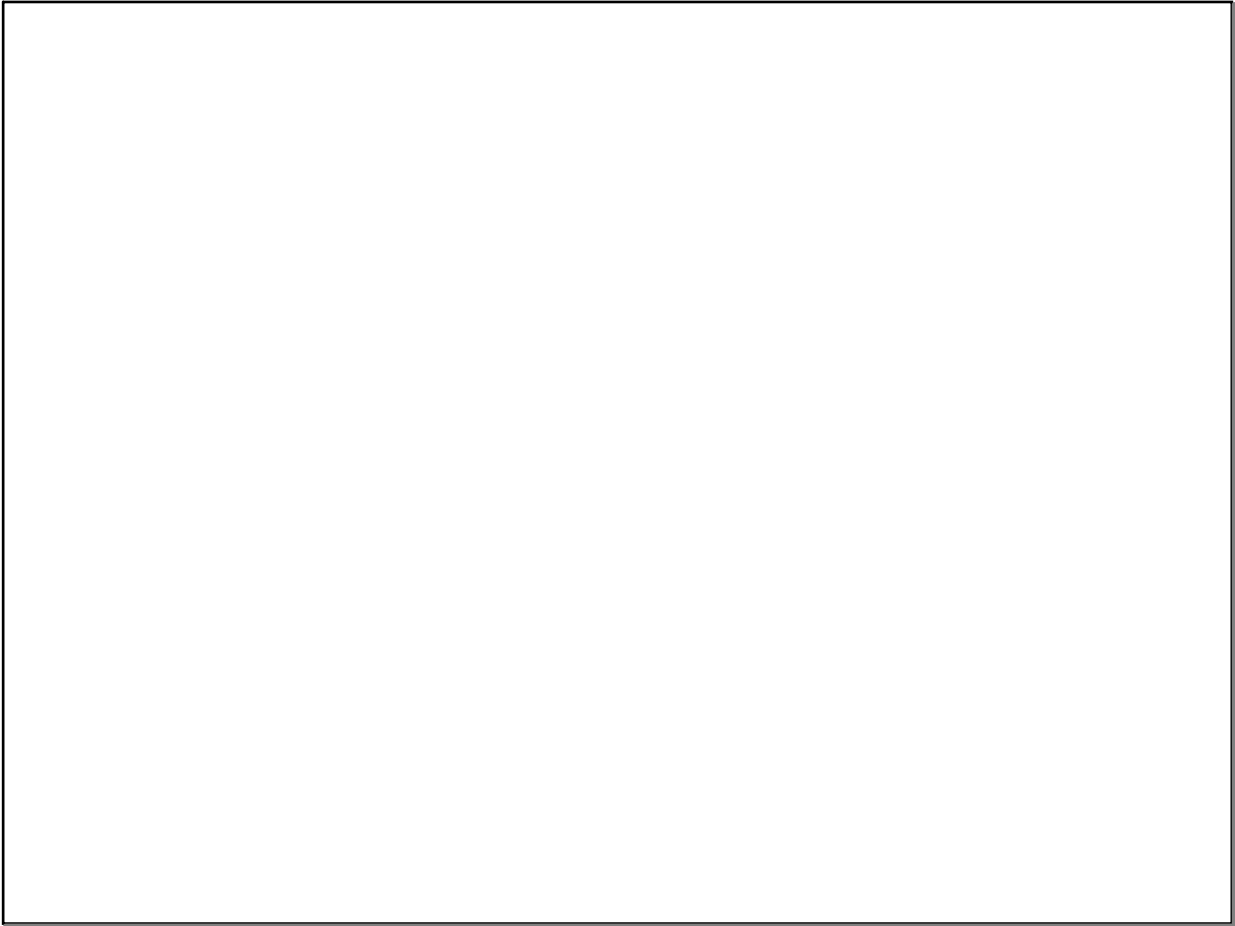
b) Can you think of another way to simplify the complex fraction below (example 1 from earlier)? Try.

$$\frac{\frac{x}{2} + \frac{1}{x}}{\frac{1}{2x}}$$

c) Would multiplying by the reciprocal be a good choice for example 2 shown below? Try it. Why or why not?

$$\frac{1 - \frac{1}{x}}{1 - \frac{1}{x^2}}$$

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