

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

8. 6

9. -3

10. -1 and 4

Aug 10-10:17 PM

## Alg 2 Homework 2-4

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

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

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

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

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

Solve and check for extraneous roots:

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

$x \neq \pm 4$

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

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

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

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

$6x+18=60$

$6x=42$

$x=7$

$\{7\}$

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

$x \neq 0, 2$

$3(x-2)=8x$

$3x-6=8x$

$-6=5x$

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

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

Aug 11-3:38 PM

(5)  $x \neq 3$

$$\frac{x^2-1}{x-3} = \frac{8}{x-3}$$

$$x^2-1=8$$

$$x^2-9=0$$

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

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

$x=3$  reject

$\{ -3 \}$

$x^2=9$   
 $x=\pm 3$   
reject 3,

6.  $\frac{6}{3x} + \frac{5}{4} = \frac{3}{x}$   $x \neq 0$

$$\frac{12x}{1} \cdot \frac{6}{3x} + \frac{12x}{1} \cdot \frac{5}{4} = \frac{12x}{1} \cdot \frac{3}{x}$$

$$24 + 15x = 36$$

$$15x = 12$$

$$x = \frac{12}{15} = \frac{4}{5}$$

$\{ \frac{4}{5} \}$

5)  $(x-3)(x^2-1) = 8(x-3)$

$$x^3 - x - 3x^2 + 3 = 8x - 24$$

$$x^3 - 3x^2 - 9x + 27 = 0$$

$$x^3 - 3x^2 - 9x + 27 = 0$$

$$x^2(x-3) - 9(x-3) = 0$$

$$(x-3)(x^2-9) = 0$$

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

$$x=3 \text{ } x=3 \text{ } x=-3$$

$\{ -3 \}$

7.  $\frac{x+3}{3x+6} + \frac{4}{x+2} = \frac{14}{3}$   $x \neq -2$

$$\frac{3(x+2)}{1} \cdot \frac{x+3}{3(x+2)} + \frac{3(x+2)}{1} \cdot \frac{4}{x+2} = \frac{14}{3} \cdot \frac{3(x+2)}{1}$$

$$x+3 + 12 = 14(x+2)$$

$$x+15 = 14x+28$$

$$-13 = 13x$$

$$-1 = x$$

$\{ -1 \}$

8.  $\frac{1}{2} + \frac{2}{x} = \frac{3}{x} + \frac{1}{3}$   $x \neq 0$

$$\frac{6x}{1} \cdot \frac{1}{2} + \frac{6x}{1} \cdot \frac{2}{x} = \frac{6x}{1} \cdot \frac{3}{x} + \frac{6x}{1} \cdot \frac{1}{3}$$

$$3x + 12 = 18 + 2x$$

$$x = 6$$

$\{ 6 \}$

Aug 11-3:38 PM

9.  $\frac{x}{x-2} + \frac{x}{x^2-4} = \frac{x+3}{x+2}$   $x \neq \pm 2$

$$\frac{(x+2)(x-2)}{1} \cdot \frac{x}{x-2} + \frac{(x+2)(x-2)}{1} \cdot \frac{x}{(x+2)(x-2)} = \frac{(x+2)(x-2)}{1} \cdot \frac{x+3}{x+2}$$

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

$$x^2 + 2x + x = x^2 + 3x - 2x - 6$$

$$3x = x - 6$$

$$2x = -6$$

$$x = -3$$

$\{ -3 \}$

10.  $\frac{12}{x+1} - \frac{8}{x} = \frac{2}{1} \cdot \frac{x(x-1)}{1}$   $x \neq 0, 1$

$$12x - 8(x-1) = 2x(x-1)$$

$$12x - 8x + 8 = 2x^2 - 2x$$

$$0 = 2x^2 - 6x - 8$$

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

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

$$\begin{array}{l|l} x-4=0 & x+1=0 \\ x=4 & x=-1 \end{array}$$

$\{ -1, 4 \}$

Aug 11-3:49 PM

Rational Expressions  $\frac{2a \neq 0}{2} \neq 0$   $a \neq 0$  Algebra 2 Unit 2 Day 5

Warm-Up  $CCD = \frac{2a}{1}$

1.  $\left(\frac{2}{a}\right) \div \left(\frac{4}{2a}\right) \boxed{a \neq 0}$

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

$$4 = 8a + 4$$

$$0 = 8a$$

$$a = 0$$

reject (extraneous root)

$\{ \}$  or  $\emptyset$

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

$CCD = x(x-4)$

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

$$x^2 + 4x - 4x - 16 + 3x = -16$$

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

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

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

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

$x = 0$  reject extraneous root

$x = -3$

Aug 10-10:17 PM

Complex Fractions

Def  $\rightarrow$  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.

LCD =  $2x$

Simplify

$$1. \frac{\frac{x}{2} + \frac{1}{x}}{\frac{1}{2x}} = \frac{\frac{2x}{1} \left(\frac{x}{2}\right) + \left(\frac{1}{x}\right) \frac{2x}{1}}{\left(\frac{1}{2x}\right) \frac{2x}{1}} = \frac{x^2 + 2}{1} = \boxed{x^2 + 2}$$

Aug 10-10:18 PM

2.  $\frac{x^2(1 - \frac{1}{x})}{x^2(1 - \frac{1}{x^2})} = \frac{(x^2 - x)}{(x^2 - 1)} = \frac{x(x - 1)}{(x + 1)(x - 1)} = \frac{x}{x + 1}$

~~$\frac{(6 - x)}{(x + 1)}$~~

Sep 28-2:48 PM

3.  $\frac{x^2y^2(1 - \frac{1}{x})}{x^2y^2(1 - \frac{1}{y})} = \frac{xy^2 - x^2y}{y^2 - x^2} = \frac{xy(y - x)}{(y - x)(y + x)} = \frac{xy}{(y + x)}$

Aug 10-10:18 PM

$$\frac{y^2(4 - \frac{1}{y^2})}{\frac{4}{y} - \frac{1}{y^2}} = \frac{(4y^2 - 1)}{(2y - 1)} = \frac{(2y+1)(2y-1)}{(2y-1)} = 2y+1$$

$$\frac{2y-1}{-1} = -2y+1$$

Sep 28-2:48 PM

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

$$= \frac{2y+1}{1} = \boxed{2y+1}$$

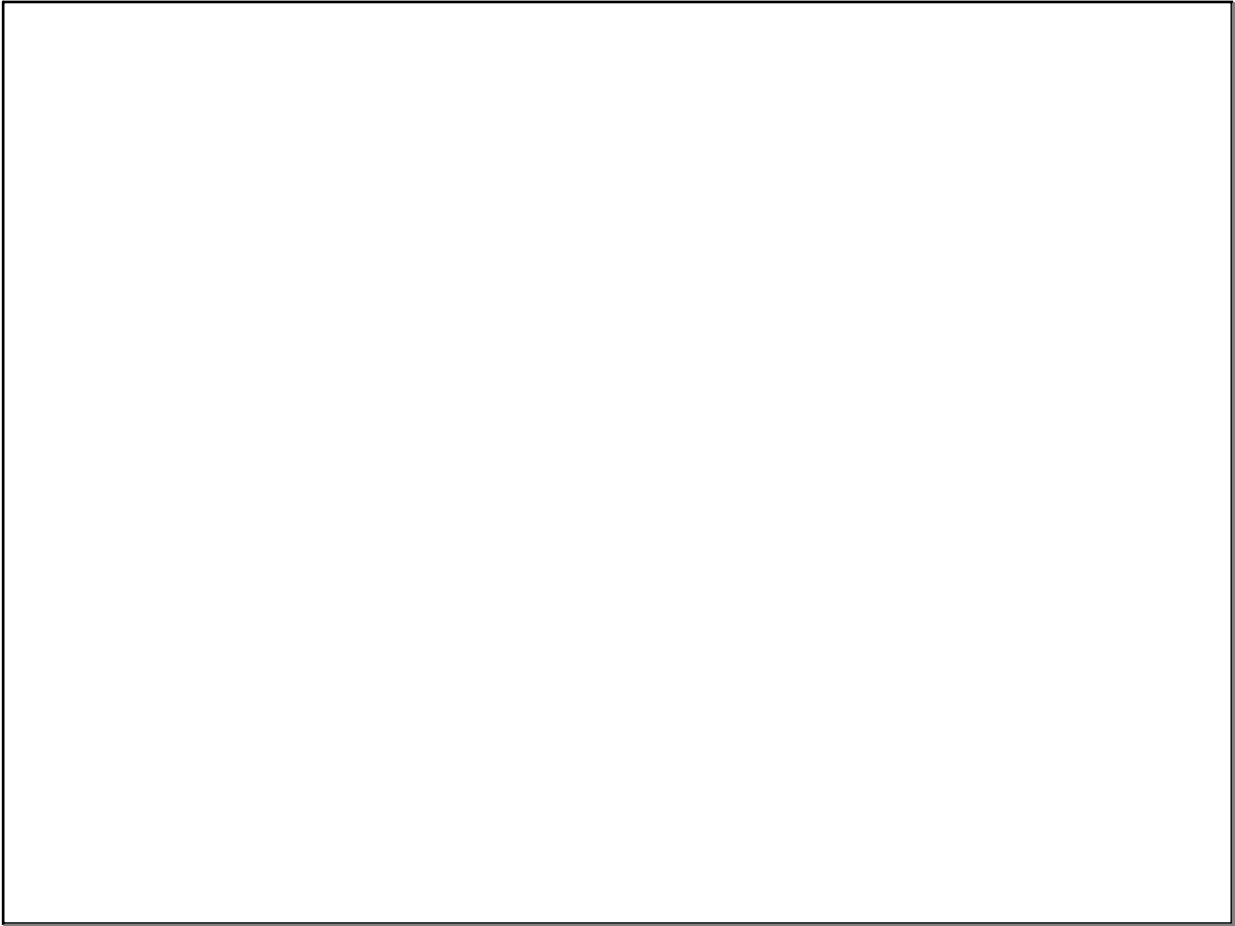
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$$\frac{\frac{2x}{5} \cdot \frac{3}{x} + \frac{x}{2} \cdot \frac{2x}{1}}{\frac{2x}{1} \cdot \frac{1}{1} - \frac{1}{x} \cdot \frac{2x}{1}} = \frac{6 + x^2}{2x - 2} = \frac{6 + x^2}{2(x-1)}$$

Aug 10-10:18 PM

$$\frac{\frac{xy}{6} \cdot \frac{y}{x} - \frac{1}{1} \cdot \frac{xy}{1}}{\frac{xy}{1} \cdot \frac{1}{x} - \frac{1}{y} \cdot \frac{xy}{1}} = \frac{y^2 - xy}{y - x} = \frac{y(y-x)}{y-x} = \frac{y}{1} = y$$

Sep 28-2:48 PM



Oct 3-8:09 PM