

2-5 HW Answer Key

1. 1 2. 6

3. $\frac{3}{2}$

4. $-y$

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

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

7. $\frac{3(x-4)}{2x}$

8. $\frac{5x}{x^2+13x+42} = \frac{5x}{(x+6)(x+7)}$

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Alg 2 Homework 2-5

Name key (2016)Solve the following equations.

$$\frac{3(x-2)}{4x} - \frac{13}{x-2} = \frac{1}{3}$$

LCO = $3(x-2)$
 $x \neq 2$

$$\frac{3(x-2)}{4x} \cdot \frac{3(x-2)}{3(x-2)} - \frac{13}{x-2} \cdot \frac{3(x-2)}{3(x-2)} = \frac{1}{3} \cdot \frac{3(x-2)}{3(x-2)}$$

$$\frac{3(x-2)}{4x} - \frac{13}{x-2} = \frac{1}{3}$$

$$12x - 13 = x - 2$$

$$11x = 11$$

$$x = 1$$

$\{1\}$

$$2. \frac{x}{2x+8} + \frac{1}{x-4} = \frac{16}{x^2-16}$$

$x(x-4) + 2(x+4) = 32$
 $x^2 - 4x + 2x + 8 = 32$
 $x^2 - 2x - 24 = 0$
 $(x-6)(x+4) = 0$
 $x = 6 \quad | \quad x = -4$
 reject

$\{6\}$

Simplify the following fractions.

$$3. \frac{\frac{x}{3} \left(\frac{9}{2x} \right)}{\frac{9}{9}} = \frac{3x}{2x} = \frac{3}{2}$$

$$\frac{\left(\frac{8y}{8} \right) \left(\frac{1}{8} - \frac{y}{8} \right) \left(\frac{8y}{8} \right)}{\frac{1}{8} - \frac{1}{y} \left(\frac{8y}{8} \right)} = \frac{8y - y^2}{y - 8} = \frac{y(8-y)}{y-8}$$

$-y$

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$$\begin{aligned}
 5. \frac{x}{x+1} \cdot \frac{3}{x+1} &= \frac{3x}{(x+1)(x+1)} = \frac{3x}{x^2+2x+1} \\
 &= \frac{3x}{3x^2+3x+x^2+x} = \frac{3x}{4x^2+4x} = \frac{3}{4x+4}
 \end{aligned}$$

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

$\text{LCD} = x(x+2)$
 $\text{LCD} = x(x+6)$

$$\begin{aligned}
 7. \frac{\frac{3}{2x}}{\frac{1}{x-4}} &= (x-4) \left(\frac{3}{2x} \right) \\
 &= \frac{3(x-4)}{2x} \\
 &= \frac{3x-12}{2x}
 \end{aligned}$$

$$\begin{aligned}
 8. \frac{\frac{5}{x+6}}{\frac{7}{x+6} + 1} &= \frac{5x}{7x+42+x^2+6x} \\
 &= \frac{5x}{x^2+13x+42}
 \end{aligned}$$

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$$\begin{aligned}
 6. \frac{\frac{2}{x} + \frac{1}{x}}{\frac{2x}{x+2}} &= \frac{\frac{2+1}{x}}{\frac{2x}{x+2}} = \frac{\frac{3}{x}}{\frac{2x}{x+2}} \\
 &= \frac{3}{x} \cdot \frac{x+2}{2x} = \frac{3(x+2)}{2x^2} \\
 &= \frac{3x+6}{2x^2}
 \end{aligned}$$

$\frac{2x}{x} = 2$

Rational Expressions

Algebra 2 Unit 2 Day 6

HW 2-6
tonight!
not 2-5

Multiplying Rational Expressions

- A. **Factor** all numerators and denominators (only if + or - signs)
 B. Divide out common factors
 C. Look for a factor of -1 $\frac{x-1}{1-x} = -1$
 D. Write as a single fraction

Simplify before you multiply!

Multiply. Assume that all expressions are defined.

$$1. \frac{2x^4y^5}{3x^2} \cdot \frac{15x^2}{8x^3y^2}$$

$$= \frac{2 \cdot 3 \cdot 5 \cdot x^4 \cdot y^5}{3 \cdot 8 \cdot x^2 \cdot x^3 \cdot y^2}$$

$$= \frac{5x^3y^3}{4}$$

$$\frac{(x+2)(x+4)}{(3x+12)(x^2-4)} = \frac{1}{3(x-2)}$$

$$3(x+4)(x-2)(x+2)$$

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$$3. \frac{4x+16}{2x+6} \cdot \frac{x^2+2x-3}{x+4}$$

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

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

$$4. \frac{2x-4}{x+1} \cdot \frac{3x+3}{4-x^2}$$

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

$$= \frac{-6}{2+x} \cdot \frac{6}{-2-x}$$

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Dividing Rational Expressions

Change to multiplication by the reciprocal, then follow rules for multiplying.

$$\text{Rule: } \frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}$$

Multiply or divide. Assume all expressions are defined.

1. $\frac{y^2 - 16}{2y + 6} \cdot \frac{y + 3}{y + 4}$

$$\frac{\cancel{y}^x \cancel{y}^y - 16}{\cancel{2}^2 \cancel{y}^y + 6} \cdot \frac{y + 3}{y + 4}$$

$$\frac{x^3}{x^2} = \frac{x \cdot \cancel{x} \cdot \cancel{x}}{\cancel{x} \cdot \cancel{x}} = x$$

2. $\frac{4x^3}{9x^2y} \div \frac{16}{9y^5}$

$$= \frac{\cancel{4}^2 \cancel{x}^x \cancel{x}^x}{\cancel{9}^3 \cancel{x}^x \cancel{y}^y} \cdot \frac{9y^5}{16} = \frac{xy^4}{y}$$

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4. $\frac{x^2 - 4}{2x - 6} \div \frac{2 - x}{x - 3} = \frac{x^2 - 4}{2x - 6} \cdot \frac{x - 3}{2 - x} = \frac{(\cancel{x-2})(x+2)(\cancel{x-3})(-1)}{2(\cancel{x-3})(\cancel{2-x})}$

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

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6. $\frac{x^2-6x+9}{9-x^2} \cdot \frac{4x^2-4x+1}{2x^2-7x+3} = \frac{\cancel{(x-3)}\cancel{(x-3)}(-1)}{\cancel{(3-x)}(3+x)} \cdot \frac{(2x-1)\cancel{(2x-1)}}{\cancel{(x-3)}(2x-1)}$

$\begin{array}{l} \swarrow \\ 4x^2-4x+1 \quad P=4, S=-4 \\ \underline{4x^2-2x-2x+1} \quad -2, -2 \\ 2x(2x-1)-1(2x-1) \\ (2x-1)(2x-1) \end{array}$

$\begin{array}{l} 2x^2-7x+3 \quad P=6, S=-7 \\ \underline{2x^2-6x-1x+3} \quad -1, -6 \\ 2x(x-3)-1(x-3) = (x-3)(2x-1) \end{array}$

$\begin{array}{l} 2x^2-1x-6x+3 \\ x(2x-1)-3(2x-1) \end{array}$

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

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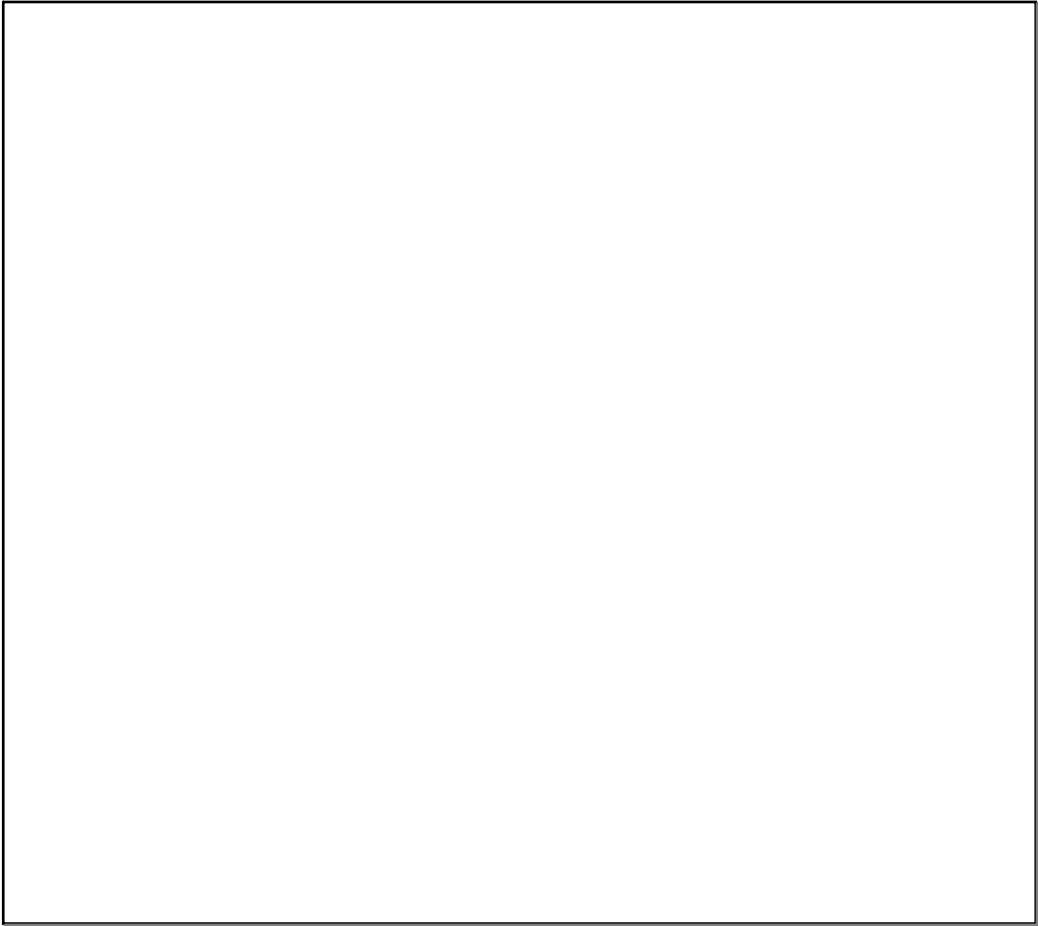
7. $\frac{x^5-4x^3}{x^2+x-2} \cdot \frac{x^5-x^4-2x^3}{x^2-1}$

$= \frac{x^3(x^2-4)}{(x+2)(x-1)} \cdot \frac{x^3(x^2-x-2)}{(x+1)(x-1)}$
 $= \frac{x^3\cancel{(x+2)}(x-2)}{\cancel{(x+2)}(x-1)} \cdot \frac{x^3(x-2)\cancel{(x+1)}}{\cancel{(x+1)}(x-1)}$
 $= \frac{x^6(x-2)(x-2)}{(x-1)(x-1)} \text{ or } \frac{x^6(x-2)^2}{(x-1)^2}$

8. $\frac{x^2-5x+6}{x+4} \overset{\text{Flip}}{\div} \frac{x^2-9}{x^2+5x+4}$

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

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