

2-6 HW Answer Key

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

5. $\frac{4x-3}{2x-1}$

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

2. $\frac{2(x-2)}{x+5}$

6. $\frac{3(2x-5)}{x}$

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

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

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

12. $\frac{x+3}{3}$

4. $\frac{y^5}{8x^2}$

8. $\frac{(x+1)}{(x-1)}$

13. See next page

9. $3(x+2)$

Alg 2 Homework 2-6

Name Key (2016)Multiply. Assume that all expressions are defined.

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

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

2. $\frac{x-2}{x-3} \cdot \frac{2x-6}{x+5}$

$$\frac{\cancel{x-2}}{\cancel{x-3}} \cdot \frac{2(\cancel{x-3})}{x+5} = \boxed{\frac{2(x-2)}{x+5}}$$

3. $\frac{x^2-16}{x^2-4x+4} \cdot \frac{x-2}{x^2+6x+8}$

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

$$\boxed{\frac{x-4}{(x-2)(x+2)}}$$

4. $\frac{4x^2-12x+9}{4x^2-12x+9} \cdot \frac{8y^5}{2x^2}$

$$\frac{\cancel{4x^2-12x+9}}{\cancel{4x^2-12x+9}} \cdot \frac{8y^5}{2x^2} = \boxed{\frac{4y^5}{x^2}}$$

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

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

6. $\frac{4x^2-20x+25}{x^2-4x} \cdot \frac{3x-12}{2x-5}$

$$\frac{(2x-5)(\cancel{2x-5})}{x(\cancel{x-4})} \cdot \frac{3(\cancel{x-4})}{\cancel{2x-5}} = \boxed{\frac{3(2x-5)}{x}}$$

$$7. \frac{4x^2+15x+9}{8x^2+10x+3} \div \frac{x^2+4x}{2x+1}$$

$$\frac{4x^2+15x+9}{8x^2+10x+3} \cdot \frac{2x+1}{x^2+4x}$$

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

$$\boxed{\frac{x+3}{x(x+4)}}$$

$$8. \frac{x^2-4x-5}{x^2-3x+2} \div \frac{x^2-3x-10}{x^2-4}$$

$$\frac{x^2-4x-5}{x^2-3x+2} \cdot \frac{x^2-4}{x^2-3x-10}$$

$$\frac{(x-5)(x+1)}{(x-2)(x-1)} \cdot \frac{(x+2)(x-2)}{(x-5)(x+2)}$$

$$\boxed{\frac{x+1}{x-1}}$$

$$9. \frac{x+2}{x-4} \div \frac{1}{3x-12}$$

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

$$\boxed{3(x+2)}$$

$$10. \frac{x^2-2x-3}{x^2-x-2} \div \frac{x^2+2x-15}{x^2+x-6}$$

$$\frac{x^2-2x-3}{x^2-x-2} \cdot \frac{x^2+x-6}{x^2+2x-15}$$

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

$$\boxed{\frac{x+3}{x+5}}$$

Multiply or divide. Simplify if possible. Assume all fractions are defined.

$$11. \frac{x^2 - 2x - 8}{9x^2 - 16} \cdot \frac{3x^2 + 10x + 8}{x^2 - 16}$$

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

$$\boxed{\frac{(x+2)^2}{(3x-4)(x+4)}}$$

$$12. \frac{3x^2 + 7x - 6}{3x - 12} \div \frac{6x^2 - x - 2}{2x^2 - 7x - 4}$$

$$\frac{3x^2 + 7x - 6}{3x - 12} \cdot \frac{2x^2 - 7x - 4}{6x^2 - x - 2}$$

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

$$\boxed{\frac{x+3}{3}}$$

13. Show why dividing by a fraction is the same as multiplying by its reciprocal.

$$\frac{\frac{a}{b}}{\frac{c}{d}} = \frac{a}{b} \cdot \frac{d}{c} = \frac{ad}{bc}$$

$$\frac{\left(\frac{ad}{1}\right) \frac{a}{b}}{\left(\frac{bc}{1}\right) \frac{c}{d}} = \frac{ad}{bc}$$

Review Activity Answer Key

1. $\frac{2}{3}, x \neq 0, -5$

2. $-(x-4)$ or $-x+4$

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

4. $\frac{-2x^2+3x+6}{(x-9)(x+2)}$

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

6. x^2+3

7. $\{8\}$

8. $\{ \}$ or $\emptyset$

9. $\frac{(x)(x+5)}{(x+4)}, x \neq \pm 4$
b) also $x \neq 0$

1a) Simplify and identify any x-values for which the expression is undefined.

$$\frac{2x^2 + 10x}{3x^2 + 15x}$$

$$\frac{\cancel{2x}(\cancel{x+5})}{\cancel{3x}(\cancel{x+5})} = \boxed{\frac{2}{3}}$$

$x \neq 0, -5$

2a) Multiply: $\frac{x^2 - 16}{9 - x} \cdot \frac{x^2 + x - 90}{x^2 + 14x + 40}$

$$\frac{(x-4)(\cancel{x+4})}{\cancel{9-x}} \cdot \frac{(x+10)(\cancel{x-4})^{-1}}{(\cancel{x+6})(\cancel{x+4})}$$

$$\boxed{-1(x-4)}$$

or

$$\boxed{-x+4}$$

3a) Divide: $\frac{x^2 + 2x - 3}{x^2 - 9} \div \frac{x^2 + 3x - 4}{x^2 - 2x - 3}$

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

$$\boxed{\frac{x+1}{x+4}}$$

4a) Add. Simplify if possible.

$$\frac{x^2 - 24x + 6}{x^2 - 7x - 18} + \frac{-3x}{x+2} \left(\frac{x-9}{x-9} \right)$$

$$\frac{x^2 - 24x + 6}{(x-9)(x+2)} + \frac{-3x^2 + 27x}{(x+2)(x-9)}$$

$$\boxed{\frac{-2x^2 + 3x + 6}{(x-9)(x+2)}}$$

5a) Subtract. Simplify if possible.

$$\left(\frac{x+3}{x+3} \right) \frac{4x}{x-4} - \frac{2x^2 + 5x - 4}{x^2 - x - 12}$$

$$\frac{4x^2 + 12x}{(x+3)(x-4)} - \frac{2x^2 + 5x - 4}{(x-4)(x+3)}$$

$$\boxed{\frac{2x^2 + 7x + 4}{(x-4)(x+3)}}$$

6a) Simplify the complex fraction.

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

$$\frac{x^2 + 3}{1}$$

$$\boxed{x^2 + 3}$$

7a) Solve: $\frac{15}{4} = \frac{6}{x} + 3$ $x \neq 0$

$$\frac{4x}{1} \left(\frac{15}{4} \right) = \frac{4x}{1} \left(\frac{6}{x} \right) + \frac{4x}{1} (3)$$

$$15x = 24 + 12x$$

$$3x = 24$$

$$x = 8$$

$$\{8\}$$

8a) Solve: $\frac{4}{x^2-4} = \frac{1}{x-2}$ $x \neq \pm 2$

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

$$x^2 - 4 = 4x - 8$$

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

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

$$x - 2 = 0$$

$$\cancel{x - 2} = 2$$

or

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

$$4 = x + 2$$

$$\cancel{2} = x$$

9a) Simplify and identify any x-values for which the expression is undefined.

$$\frac{x^3 + x^2 - 20x}{x^2 - 16}$$

$$\frac{x(x^2 + x - 20)}{(x - 4)(x + 4)}$$

$$\frac{x(x + 5)(\cancel{x - 4})}{(\cancel{x - 4})(x + 4)} \quad x \neq \pm 4$$

$$\boxed{\frac{x(x + 5)}{x + 4}}$$

1b) Simplify and identify any x-values for which the expression is undefined.

$$\frac{4x^3 + 20x^2}{6x^3 + 30x^2}$$

$$\frac{2\cancel{x}^2(\cancel{x+5})}{3\cancel{x}^2(\cancel{x+5})} = \boxed{\frac{2}{3}}$$

$x \neq -5, 0$

2b) Multiply: $\frac{x^2 - 2x - 8}{8 - x} \cdot \frac{x^2 + 2x - 80}{x^2 + 12x + 20}$

$$\frac{(x-4)(\cancel{x+2})}{8-\cancel{x}} \cdot \frac{(x+10)(\cancel{x-8})}{(x+10)(\cancel{x+2})}$$

$$\boxed{-1(x-4) \text{ or } -x+5}$$

3b) Divide: $\frac{x^2 - 2x - 3}{x^2 + 2x - 15} \div \frac{x^2 - x - 20}{x^2 - 25}$

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

$$\boxed{\frac{x+1}{x+4}}$$

4b) Subtract. Simplify if possible.

$$\frac{7x+6}{x^2-7x-18} - \frac{2x}{x-9} \left(\frac{x+2}{x+2} \right)$$

$$\frac{7x+6}{(x-9)(x+2)} - \frac{2x^2+4x}{(x-9)(x+2)}$$

$$\boxed{\frac{-2x^2+3x+6}{(x-9)(x+2)}}$$

5b) Add. Simplify if possible.

$$\frac{x+4}{x^2-x-12} + \frac{2x}{x-4} \left(\frac{x+3}{x+3} \right)$$

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

$$\boxed{\frac{2x^2+7x+4}{(x-4)(x+3)}}$$

6b) Simplify the complex fraction.

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

$$\frac{x^2+3}{1}$$

$$\boxed{x^2+3}$$

7b) Solve: $\frac{5}{4} - \frac{x}{x-4} = \frac{-3}{x-4}$

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

$$5(x-4) - 4x = -12$$

$$5x - 20 - 4x = -12$$

$$x = 8$$

$$\{8\}$$

OR: $\frac{5}{4} = \frac{-3}{x-4} + \frac{x}{x-4}$

$$\frac{5}{4} = \frac{x-3}{x-4}$$

$$5x - 20 = 4x - 12$$

$$x = 8$$

$$\{8\}$$

8b) Solve: $\frac{4x}{x-4} = \frac{2x+8}{x-4} \quad x \neq 4$

$$\left(\frac{x-4}{1} \right) \frac{4x}{x-4} = \frac{2x+8}{x-4} \left(\frac{x-4}{1} \right)$$

$$4x = 2x + 8$$

$$2x = 8$$

$$\cancel{x=4} \quad \{3\}$$

OR: $4x(x-4) = (2x+8)(x-4)$

$$4x^2 - 16x = 2x^2 - 32$$

$$2x^2 - 16x + 32 = 0$$

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

$$(x-4)^2 = 0$$

$$x-4=0$$

$$\cancel{x=4} \quad \{3\}$$

9b) Simplify and identify any x-values for which the expression is undefined.

$$\frac{x^5 + x^4 - 20x^3}{x^5 - 16x^4}$$

$$\frac{x^5(x^2 + x - 20)}{x^4(x^2 - 16)}$$

$$\frac{x^5(x^2 + x - 20)}{x^4(x^2 - 16)}$$

$$\frac{x^5(x+5)(x-4)}{x^4(x+4)(x-4)}$$

$$\frac{x^5(x+5)(x-4)}{x^4(x+4)(x-4)}$$

$$\boxed{\frac{x(x+5)}{x+4}}$$

$$x \neq \pm 4, 0$$

2-7 (Review) HW Answer Key

1. $\frac{x}{(x-2)}, x \neq 2$

2. $\frac{8x}{(x-2)}, x \neq 0, 2$

3. $\frac{x}{(x-2)}, x \neq 1, 2$

4. $\frac{(x+2)}{(x)(x+1)}$

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

6. $\frac{(x+7)}{(x-2)}$

7. -2

8. $\frac{(2x-5)}{x}$

9. 4

10. $\frac{4x+3}{(x)(x-3)}$

11. $\frac{1}{(y+3)}$

12. 3

13. {4}

14. {6, 3}

15. { } or $\emptyset$

16. {2}

Alg 2 Homework 2-7 (Review)

Name _____

Simplify and identify any x-values for which the expression is undefined.

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

$x \neq 2$

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

$x \neq 0, 2$

$$3. \frac{4x^2-4x}{4x^2-12x+8} = \frac{x(x-1)}{(x-2)(x-1)}$$

$x \neq 2, 1$

Multiply or divide. Simplify if possible.

$$4. \frac{x^2+2x}{x^2-6x-7} \cdot \frac{x-7}{x^2}$$

$\frac{x(x+2)}{(x-7)(x+1)} \cdot \frac{x-7}{x^2} = \frac{x+2}{x(x+1)}$

$$5. \frac{2x-7}{2x^2-5x-3} \cdot \frac{3x-9}{21-6x}$$

$\frac{2x-7}{(2x+1)(x-3)} \cdot \frac{3(x-3)}{3(7-2x)} = \frac{-1}{2x+1}$

$$6. \frac{x^2+5x+6}{x^2-2x-15} \div \frac{x^2-4}{x^2+2x-35}$$

$\frac{x^2+5x+6}{x^2-2x-15} \cdot \frac{x^2+2x-35}{x^2-4}$

$\frac{(x+2)(x+3)}{(x-5)(x+3)} \cdot \frac{(x+7)(x-5)}{(x-2)(x+2)} = \frac{x+7}{x-2}$

$$7. \frac{x^2-9}{9-3x} \div \frac{x^2+7x+12}{6x+24}$$

$\frac{x^2-9}{9-3x} \cdot \frac{6x+24}{x^2+7x+12}$

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

Add or subtract. Simplify if possible.

$$8. \frac{10+5x}{5x} + \frac{x-7}{x}$$

$\frac{10+5x}{5x} + \frac{5x-35}{5x}$

$\frac{10x-25}{5x} = \frac{2x-5}{x}$

$$9. \frac{4a}{a-3} + \frac{12}{3-a}$$

$\frac{4a}{a-3} + \frac{-12}{a-3}$

$\frac{4a-12}{a-3} = 4$

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

$\frac{5x}{x(x-3)} - \frac{x-3}{x(x-3)}$

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

Simplify the following complex fractions.

$$\begin{aligned}
 11. \frac{3\left(\frac{y-1}{3}\right)}{3\left(\frac{y^2-3}{3}\right)} &= \frac{\cancel{3}\left(\frac{y}{\cancel{3}}\right) - 3(1)}{\cancel{3}\left(\frac{y^2}{\cancel{3}}\right) - 3(\cancel{3})} \\
 &= \frac{y-3}{y^2-9} = \frac{y-\cancel{3}}{(\cancel{y-3})(y+3)} \\
 &= \frac{1}{y+3}
 \end{aligned}$$

$$\begin{aligned}
 12. \frac{\frac{3a+6}{10} + \frac{5}{5}}{\frac{2}{5} + \frac{a}{10}} &= \frac{\cancel{10}\left(\frac{3a}{\cancel{10}}\right) + \cancel{10}\left(\frac{6}{\cancel{5}}\right)}{\cancel{2}\left(\frac{2}{\cancel{5}}\right) + \cancel{10}\left(\frac{a}{\cancel{10}}\right)} = \frac{3a+12}{4+a} \\
 &= \frac{3(a+4)}{4+a} = \boxed{3}
 \end{aligned}$$

Solve.

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

$$\begin{aligned}
 14. \frac{x-9}{1} &= \frac{-18}{x} \quad x \neq 0 \\
 x(x-9) &= -18 \\
 x^2-9x+18 &= 0 \\
 (x-6)(x-3) &= 0 \quad \{6, 3\} \\
 x=6 \quad | \quad x=3
 \end{aligned}$$

$$\begin{aligned}
 15. \frac{6x}{x-3} &= \frac{4x+6}{x-3} \quad x \neq 3 \\
 6x &= 4x+6 \\
 2x &= 6 \\
 x &= 3 \text{ reject} \\
 \{ \} \text{ or } \emptyset
 \end{aligned}$$

$$\begin{aligned}
 16. \left(\frac{1}{x} + \frac{1}{3x}\right) &= \frac{2}{3} \quad x \neq 0 \\
 \cancel{3}\left(\frac{1}{\cancel{x}}\right) + \cancel{3}\left(\frac{1}{\cancel{3x}}\right) &= \cancel{3}\left(\frac{2}{\cancel{3}}\right) \\
 3 + 1 &= 2x \\
 4 &= 2x \\
 2 &= x \quad \{2\}
 \end{aligned}$$