

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. $3(x+2)$

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Alg 2 Homework 2-6

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\frac{x-3}{3-x}$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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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. $\frac{x}{1} - \frac{18}{x} = 3$ $x \neq 0$
LCD: x

$$\left(\frac{x}{1} \cdot \frac{x}{x}\right) - \left(\frac{18}{x} \cdot \frac{x}{x}\right) = \left(\frac{x}{1} \cdot \frac{3}{1}\right)$$

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

$$-3x \quad -3x$$

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

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

$$x-6=0 \quad | \quad x+3=0$$

$$x=6 \quad | \quad x=-3$$

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

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

$$\left(\frac{4}{x^2} \cdot \frac{x^2}{x^2}\right) - \left(\frac{10}{1} \cdot \frac{x^2}{x^2}\right) = \left(\frac{3}{x} \cdot \frac{x^2}{x^2}\right)$$

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

$$-4 + 10x^2 \quad +10x^2 - 4$$

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

$$10x^2 + 8x - 5x - 4 = 0$$

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

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

$$5x+4=0 \quad | \quad 2x-1=0$$

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

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

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

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

$$x-5 + 5 = 2x-5$$

$$x = 2x-5$$

$$-2x \quad -2x$$

$$-x = -5$$

$$x = 5$$

reject

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

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

$$x^2 + 5x - 20 = 4$$

$$x^2 + 5x - 24 = 0$$

$$(x+8)(x-3) = 0$$

$$x+8=0 \quad | \quad x-3=0$$

$$x = -8 \quad | \quad x = 3$$

$$\{-8, 3\}$$

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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?

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Based on your knowledge of adding and subtracting fractions, try to solve the following equations, and state any domain restrictions.

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

Domain Restrictions: _____

4. $\frac{3}{x} - \frac{9}{x} = -2$

Domain Restrictions: _____

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5. $\frac{3}{x+1} - \frac{2}{x} = \frac{1}{12}$

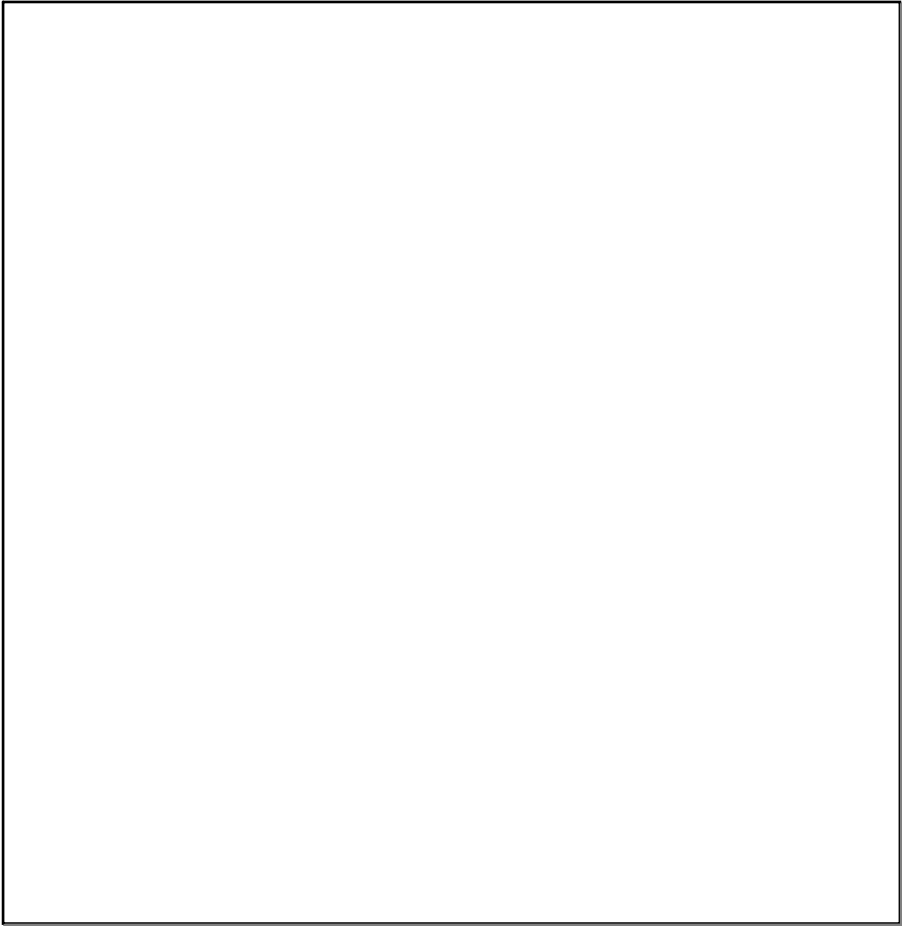
Domain Restrictions: _____

6. $x - \frac{15}{x+3} = \frac{5x}{x+3}$

Domain Restrictions: _____

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