Name _____ Date _____

Additional Exercises 8.1
Form I
Rational Expressions and Their Simplification

Find all values that make the expression undefined.

1. $\frac{7}{a+1}$ 1. _____

2. $\frac{4}{a-3}$ 2. _____

3. $\frac{x-2}{5}$ 3. _____

4. $\frac{m+4}{3-m}$ 4. _____

5. $\frac{3x-2}{y^2-16}$ 5. _____

6. $\frac{x^2-64}{x^2-4x-5}$ 6. _____

7. $\frac{6}{x^2+9}$ 7. _____

8. $\frac{24x^4}{6x^3}$ 8. _____

Name _____ Date _____

Simplify the expression.

9. $\frac{2x+4}{2}$ 9. _____

10. $\frac{3x-9}{x-3}$ 10. _____

11. $\frac{8-m}{m-8}$ 11. _____

12. $\frac{x+5}{x^2-25}$ 12. _____

13. $\frac{5x+1}{5x-1}$ 13. _____

14. $\frac{x^2-25}{x^2-10x+25}$ 14. _____

15. A tennis racket company has manufacturing costs given by the equation $C=\frac{40x+40{,}000}{x}$ where x is the number of rackets manufactured and C is the cost to manufacture each racket. Find the cost per racket when manufacturing 1000 rackets. 15. _____

Name _____ Date _____

Additional Exercises 8.1
Form II
Rational Expressions and Their Simplification

Find all values that make the expression undefined.

1. $\frac{9}{a-8}$ 1. _____

2. $\frac{4}{a+6}$ 2. _____

3. $\frac{r-7}{4}$ 3. _____

4. $\frac{m-8}{6-m}$ 4. _____

5. $\frac{5y-4}{y^2-49}$ 5. _____

6. $\frac{x^2-100}{x^2+13x+40}$ 6. _____

7. $\frac{x^2-36}{x^2-10x+16}$ 7. _____

Simplify the expression.

8. $\frac{10k^3}{5k}$ 8. _____

Name _____ Date _____

9. $\dfrac{4x+4}{12x^2+20x+8}$ 9. _____

10. $\dfrac{y^2+14y+49}{y^2+15y+56}$ 10. _____

11. $\dfrac{4-m}{m-4}$ 11. _____

12. $\dfrac{2k-4}{14-7k}$ 12. _____

13. $\dfrac{4x^2-10x+6}{x-1}$ 13. _____

14. $\dfrac{7x^2+21x^3}{4x+12x^2}$ 14. _____

15. A tennis racket company has manufacturing costs given by the equation $C=\dfrac{40x+40{,}000}{x}$ where x is the number of rackets manufactured and C is the cost to manufacture each racket. Find the cost per racket to manufacture 5000 rackets. 15. _____

Name _____ Date _____

Additional Exercises 8.1
Form III
Rational Expressions and Their Simplification

Find all values that make the expression undefined.

1. $\dfrac{a+7}{a^2-25}$ 1. _____

2. $\dfrac{x-8}{x^2-6x+9}$ 2. _____

3. $\dfrac{7x}{3x^2-5x-2}$ 3. _____

4. $\dfrac{2x+9}{4x^2-25x-21}$ 4. _____

5. $\dfrac{a-7}{3a^2-a-4}$ 5. _____

6. $\dfrac{17}{5a^2-19a-4}$ 6. _____

7. $\dfrac{x^3+4x^2}{x^2+49}$ 7. _____

Simplify the expression.

8. $\dfrac{x^2-7x+12}{x^2-9x+20}$ 8. _____

Name _____ Date _____

9. $\dfrac{6x+24}{x^2-16}$ 9. _____

10. $\dfrac{x^2-y^2}{x^3-y^3}$ 10. _____

11. $\dfrac{x^2-4x-12}{x^2+8x+12}$ 11. _____

12. $\dfrac{a^2-ab+10a-10b}{a+10}$ 12. _____

13. $\dfrac{y^3-8}{y-2}$ 13. _____

14. $\dfrac{x^2+4x+25}{x^2+5x+6}$ 14. _____

15. A tennis racket company has manufacturing costs given by the equation $C=\dfrac{40x+40{,}000}{x}$ where x is the number of rackets manufactured and C is the cost to manufacture each racket. Find the cost per racket to manufacture 32,000 rackets. 15. _____

Name _____ Date _____

Additional Exercises 8.2
Form I
Multiplying and Dividing Rational Expressions

Perform the indicated operations. Simplify if possible.

1. $\frac{3x^2}{4} \cdot \frac{32}{x^3}$ 1. _____

2. $\frac{3z^3}{5} \cdot \frac{30}{z^2}$ 2. _____

3. $\frac{a}{b} \cdot \frac{b}{c} \cdot \frac{c}{d}$ 3. _____

4. $\frac{5}{x} \cdot \frac{x^2}{15}$ 4. _____

5. $\frac{8x}{3} \cdot \frac{9}{12x^2}$ 5. _____

6. $8x^4 \cdot \frac{x^2y}{16x^3y^2}$ 6. _____

7. $\frac{y+5}{y} \cdot \frac{y}{y^2-25}$ 7. _____

8. $\frac{x+y}{x-y} \cdot \frac{x^2-y^2}{2x+2y}$ 8. _____

Name _____ Date _____

9. $\frac{2x^2}{5} \div \frac{x^3}{35}$ 9. _____

10. $\frac{3p-3}{p} \div \frac{10p-10}{9p^2}$ 10. _____

11. $\frac{(y-2)^2}{3} \div \frac{3y-6}{9}$ 11. _____

12. $\frac{21x-21}{12} \div \frac{7x-7}{60}$ 12. _____

13. $\frac{x^2-y^2}{x^2+y^2} \div (x+y)$ 13. _____

14. $\frac{4x-12}{4} \div \frac{5x-15}{8}$ 14. _____

15. $\frac{4}{x^2-16} \div \frac{8x-4}{x+4}$ 15. _____

Name _____ Date _____

Additional Exercises 8.2
Form II
Multiplying and Dividing Rational Expressions

Perform the indicated operations. Simplify if possible.

1. $\frac{4p-4}{p} \cdot \frac{3p^2}{5p-5}$ 1. _____

2. $\frac{a^2-16}{a^2-25} \cdot \frac{a-5}{a-4}$ 2. _____

3. $\frac{x-3}{x-2} \cdot \frac{x^2-4}{x^2-9}$ 3. _____

4. $\frac{x^2-4}{3x-12} \cdot \frac{x-4}{x^2+6x+8}$ 4. _____

5. $x^2-49 \cdot \frac{5}{x+7}$ 5. _____

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

7. $\frac{x^2-6x+9}{x+2} \cdot \frac{x^2-4}{x-3}$ 7. _____

8. $\frac{x^2+7x+12}{12} \cdot \frac{4}{x+4}$ 8. _____

Name _____ Date _____

9. $\frac{x+y}{x-y} \div \frac{y+x}{y-x}$ 9. _____

10. $x^2 - 5x - 14 \div \frac{x^2 - 4x - 21}{x+3}$ 10. _____

11. $\frac{x^2 - 4x + 4}{5x - 10} \div \frac{11x - 22}{55}$ 11. _____

12. $\frac{x^2 + 13x + 40}{x - 5} \div x + 8$ 12. _____

13. $\frac{x^2 - 81}{x^2 - 18x + 81} \div \frac{1}{x^2 - 9x}$ 13. _____

14. $\frac{x^2 - 6x + 8}{x^2 - 5x + 6} \div \frac{x^2 - 7x + 12}{x^2 - 4x + 4}$ 14. _____

15. $\frac{x^2 - 64}{x^2 - 16} \div \frac{x - 8}{x - 4}$ 15. _____

Name _____ Date _____

Additional Exercises 8.2
Form III
Multiplying and Dividing Rational Expressions

Perform the indicated operations. Simplify if possible.

1. $\dfrac{k^2+11k+18}{k^2+18k+81}\cdot\dfrac{k^2+9k}{k^2-7k-18}$ 1. _____

2. $\dfrac{k^2+12k+32}{k^2+15k+56}\cdot\dfrac{k^2+7k}{k^2+13k+36}$ 2. _____

3. $\dfrac{k^2+12k+36}{k^2+11k+30}\cdot\dfrac{k^2+13k+40}{k^2+14k+48}$ 3. _____

4. $\dfrac{x^2-15x+56}{x^2-17x+60}\cdot\dfrac{x^2-6x+5}{x^2-19x+88}$ 4. _____

5. $\dfrac{x^3+1}{x^3-x^2+x}\cdot\dfrac{4x}{-48x-48}$ 5. _____

6. $\dfrac{x^3-1}{x+1}\div\dfrac{x^2+x+1}{x^2+2x+1}$ 6. _____

7. $\dfrac{x^3+8}{x-2}\div\dfrac{x^2-2x+4}{x^2-4x+4}$ 7. _____

8. $\dfrac{x^3+y^3}{(x+y)^3}\cdot\dfrac{x^2-xy+y^2}{x^2+2xy+y^2}$ 8. _____

Name _____ Date _____

9. $\dfrac{z^2+12z+32}{z^2+15z+56} \div \dfrac{z^2+4z}{z^2+15z+56}$ 9. _____

10. $\dfrac{z^2+11z+28}{z^2+13z+42} \div \dfrac{z^2+4z}{z^2+2z-24}$ 10. _____

11. $\dfrac{a^2-21a+108}{9-a} \div (a+12)$ 11. _____

12. $\dfrac{p^2-10p+pq-10q}{2p^2-2q^2} \div \dfrac{p-10}{7p-7q}$ 12. _____

13. $\dfrac{x^2-2x+1}{3x^2+7x-20} \div \dfrac{x^2+3x-4}{3x^2-2x-5}$ 13. _____

14. $\dfrac{2x^2-5x-12}{4x^2+8x+3} \div \dfrac{x^2-16}{2x^2+7x+3}$ 14. _____

15. $\dfrac{x^3+2x^2-9x-18}{x^4+3x^3-4x^2-12x} \div \dfrac{x^2-x-6}{x^3+5x^2+6x}$ 15. _____

Name _____ Date _____

Additional Exercises 8.3
Form I
Adding and Subtracting Rational Expressions with the Same Denominator

Perform the indicated operations and simplify.

1. $\frac{8}{14x}+\frac{3}{14x}$ 1. _____

2. $\frac{10}{13x}-\frac{5}{13x}$ 2. _____

3. $\frac{x+7}{5}+\frac{3x-2}{5}$ 3. _____

4. $\frac{8a+3b}{2}-\frac{8a-3b}{2}$ 4. _____

5. $\frac{3}{x+2}+\frac{5}{x+2}$ 5. _____

6. $\frac{9}{x-1}-\frac{8}{x-1}$ 6. _____

7. $\frac{x}{x+2}+\frac{3x+1}{x+2}$ 7. _____

8. $\frac{10}{8x^2}-\frac{3}{8x^2}$ 8. _____

Name _____ Date _____

9. $\frac{9}{x-3}+\frac{7}{3-x}$ 9. _____

10. $\frac{10}{x-4}-\frac{7}{4-x}$ 10. _____

11. $\frac{9}{x-2}+\frac{8}{2-x}$ 11. _____

12. $\frac{5}{x-8}-\frac{4}{8-x}$ 12. _____

13. $\frac{5}{x-2}-\frac{8}{2-x}$ 13. _____

14. $\frac{6}{x-5}+\frac{3}{5-x}$ 14. _____

15. $\frac{7}{x-1}-\frac{9}{1-x}$ 15. _____

Name _____ Date _____

Additional Exercises 8.3
Form II
Adding and Subtracting Rational Expressions with the Same Denominator

Perform the indicated operations and simplify.

1. $\frac{x}{x+3}+\frac{3}{x+3}$ 1. _____

2. $\frac{5}{y-5}-\frac{y}{y-5}$ 2. _____

3. $\frac{6m}{m-3}+\frac{-18}{m-3}$ 3. _____

4. $\frac{3y^2}{y-1}+\frac{-3y}{y-1}$ 4. _____

5. $\frac{16}{q-7}-\frac{8}{q-7}$ 5. _____

6. $\frac{2x+1}{5x-7}-\frac{-3x-5}{5x-7}$ 6. _____

7. $\frac{2x-3}{x-2}-\frac{x-1}{x-2}$ 7. _____

8. $\frac{7x-1}{3x+5}-\frac{4x-3}{3x+5}$ 8. _____

Name _____ Date _____

9. $\frac{3x+1}{x-3}-\frac{x+2}{3-x}$ 9. _____

10. $\frac{5-x}{x-3}-\frac{x-2}{3-x}$ 10. _____

11. $\frac{2x+3}{x-6}-\frac{4x-2}{6-x}$ 11. _____

12. $\frac{3x+7}{x-5}+\frac{2x+1}{5-x}$ 12. _____

13. $\frac{m^2-11m}{m-5}+\frac{30}{m-5}$ 13. _____

14. $\frac{8}{x+3}-\frac{6}{-x-3}$ 14. _____

15. $\frac{2-x}{x-6}-\frac{2x-3}{6-x}$ 15. _____

Name _____ Date _____

Additional Exercises 8.3
Form III
Adding and Subtracting Rational Expressions with the Same Denominator

Perform the indicated operations and simplify.

1. $\frac{y^2+2y}{y^2+y-12}-\frac{3y+6}{y^2+y-12}$ 1. _____

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

3. $\frac{4x^2+10x}{2x+3}+\frac{4x^2-3}{2x+3}$ 3. _____

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

5. $\frac{2x^2+5x+9}{x^2+x-30}+\frac{6x-15}{x^2+x-30}$ 5. _____

6. $\frac{3y}{x^2-y^2}+\frac{3x}{y^2-x^2}$ 6. _____

7. $\frac{2y^2}{4y^2-9}-\frac{7y+15}{4y^2-9}$ 7. _____

8. $\frac{2x^2}{x^2-6x-7}+\frac{11x+21}{7+6x-x^2}$ 8. _____

Name _____ Date _____

9. $\frac{2x}{2x-5}-\frac{5}{2x-5}$ 9. _____

10. $\frac{x-5}{x^2-9}-\frac{x-5}{9-x^2}$ 10. _____

11. $\frac{17}{x-8}-\frac{2}{8-x}$ 11. _____

12. $\frac{10y^2+20y+26}{9y^2-64}-\frac{7y^2-6}{9y^2-64}$ 12. _____

13. $\frac{11y^2+7}{2y^2+3y+1}-\frac{6-9y}{2y^2+3y+1}-\frac{6y^2+3y}{2y^2+3y+1}$ 13. _____

14. $\frac{6y}{x^2-y^2}+\frac{6x}{y^2-x^2}$ 14. _____

15. $\frac{x^2+16}{x^2-6x-16}+\frac{4-8x}{16+6x-x^2}$ 15. _____

Name _____ Date _____

Additional Exercises 8.4
Form I
Adding and Subtracting Rational Expressions with Different Denominators

Find the least common denominator (LCD) of the rational expressions.

1. $\frac{4}{12x}$ and $\frac{7}{15x^3}$ 1. _____

2. $\frac{3}{4x}$ and $\frac{5}{18x^5}$ 2. _____

3. $\frac{11}{2xy^2}$ and $\frac{14}{5x^2y}$ 3. _____

4. $\frac{4}{15xy}$ and $\frac{6}{10x^2}$ 4. _____

5. $\frac{5}{t}$ and $\frac{4}{t-2}$ 5. _____

6. $\frac{9}{x+2}$ and $\frac{4}{x-3}$ 6. _____

7. $\frac{2}{x(x+1)}$ and $\frac{5}{x^2}$ 7. _____

Add or subtract as indicated. Simplify the result, if possible.

8. $\frac{2}{y}+\frac{5}{y^2}$ 8. _____

Name _____ Date _____

9. $4+\frac{1}{x}$ 9. _____

10. $\frac{2}{5x}+\frac{1}{2x^2}$ 10. _____

11. $\frac{6}{z^2}-\frac{9}{z}$ 11. _____

12. $\frac{-2}{5}-\frac{7}{3x}$ 12. _____

13. $\frac{2x-y}{x^2y}+\frac{x+y}{xy^2}$ 13. _____

14. $\frac{11}{z}-5$ 14. _____

15. The LCD of $\frac{1}{x-1}$ and $\frac{1}{1-x}$ is? 15. _____

Name _____ Date _____

Additional Exercises 8.4
Form II
Adding and Subtracting Rational Expressions with Different Denominators

Find the least common denominator (LCD) of the rational expressions.

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

2. $\frac{5}{x^2-9}$ and $\frac{7}{x-3}$ 2. _____

3. $\frac{4}{3a-6}$ and $\frac{7}{a^2-2a}$ 3. _____

4. $\frac{5}{x^2-4}$ and $\frac{4}{x(x-2)}$ 4. _____

5. $\frac{11}{a+1}$ and $\frac{9}{(a+1)^2}$ 5. _____

6. $\frac{2x+1}{4x-4}$ and $\frac{3x}{8x-8}$ 6. _____

7. $\frac{x^2}{x+2}$ and $\frac{7x}{x^2+5x+6}$ 7. _____

Add or subtract as indicated. Simplify the result, if possible.

8. $\frac{2}{r}+\frac{8}{r-3}$ 8. _____

Name _____ Date _____

9. $\frac{-8x-4}{x}+\frac{-9x+1}{9x}$ 9. _____

10. $\frac{3}{w-12}-\frac{4}{12-w}$ 10. _____

11. $\frac{6}{x+5}-\frac{3}{x-5}$ 11. _____

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

13. $\frac{x}{x-5}+\frac{x-5}{x}$ 13. _____

14. $\frac{3}{x-1}-\frac{2}{(x-1)^2}$ 14. _____

15. The LCD of $\frac{1}{2x-3}$ and $\frac{1}{3-2x}$ is? 15. _____

Name _____ Date _____

Additional Exercises 8.4
Form III
Adding and Subtracting Rational Expressions with Different Denominators

Find the least common denominator (LCD) of the rational expressions.

1. $\frac{1}{r^2+2r+1}$ and $\frac{1}{r^2+r}$ 1. _____

2. $\frac{3}{m^2+6m}$ and $\frac{5}{m^2+9m+18}$ 2. _____

3. $\frac{3}{x^2+7x+12}$ and $\frac{4}{x^2+6x+9}$ 3. _____

4. $\frac{3}{x^2-5x+6}$ and $\frac{12x}{x^2-4x+4}$ 4. _____

5. $\frac{14}{x^2-4}$ and $\frac{9x^2}{x^2+5y+6}$ 5. _____

6. $\frac{4}{y^3-y^2}$ and $\frac{9}{y^4-y^2}$ 6. _____

7. $\frac{5}{x^2+3x+2}$ and $\frac{3}{x^2-4}$ 7. _____

Add or subtract as indicated. Simplify the result, if possible.

8. $\frac{m+1}{m^2+3m-4}+\frac{5m+3}{m^2+10m+24}$ 8. _____

Name _____ Date _____

9. $\frac{3}{y^2-3y+2}+\frac{7}{y^2-1}$ 9. _____

10. $\frac{x}{x^2-16}-\frac{6}{x^2+5x+4}$ 10. _____

11. $\frac{2}{x^2-x-6}+\frac{3}{x^2-9}$ 11. _____

12. $\frac{8x}{x^2-16}-\frac{5}{x+4}$ 12. _____

Two formulas that approximate the dosage of a drug prescribed for children are:
Young's Rule: $C=\frac{DA}{A+12}$ and Cowling's Rule: $C=\frac{D(A+1)}{24}$.

In each formula, A = the child's age in years, D = an adult dosage, and C= the proper child's dosage. The formulas apply for ages 2 through 13.

13. Use Young's Rule to find the difference in a child's dosage for a 9-year-old and a 2-year-old child. Express the answer as a single rational (or fractional) expression in terms of D 13. _____

14. Use Cowling's Rule to find the difference in a child's dosage for a 12-year-old child and a 5-year-old child. Express the answer as a single rational (or fractional) expression in terms of D. 14. _____

15. The LCD of $\frac{1}{3x-5}$ and $\frac{1}{5-3x}$ is? 15. _____

Name _____ Date _____

Additional Exercises 8.5
Form I
Complex Rational Expressions

Simplify each complex expression.

1. $\dfrac{\frac{3}{4}}{\frac{2}{3}}$ 1. _____

2. $\dfrac{\frac{x}{8}}{\frac{5x}{16}}$ 2. _____

3. $\dfrac{\frac{x}{y^2}}{\frac{x}{y}}$ 3. _____

4. $\dfrac{\frac{1}{7}+\frac{1}{5}}{\frac{1}{3}+\frac{1}{8}}$ 4. _____

5. $\dfrac{\frac{1}{3}-\frac{1}{6}}{\frac{1}{8}-\frac{1}{7}}$ 5. _____

6. $\dfrac{\frac{1}{6}+5}{3+\frac{1}{7}}$ 6. _____

7. $\dfrac{\frac{5}{x}}{\frac{1}{x}-\frac{1}{2x}}$ 7. _____

Name _____ Date _____

8. $\dfrac{\frac{8}{a}+1}{\frac{8}{a}-1}$ 8. _____

9. $\dfrac{9+\frac{3}{x}}{\frac{x}{4}+\frac{1}{12}}$ 9. _____

10. $\dfrac{\frac{1}{x}+\frac{1}{y}}{\frac{1}{x}-\frac{1}{y}}$ 10. _____

11. $\dfrac{\frac{1}{x}+\frac{1}{2y}}{\frac{1}{x}-\frac{1}{y}}$ 11. _____

12. $\dfrac{4+\frac{2}{x}}{\frac{x}{4}+\frac{1}{8}}$ 12. _____

13. $\dfrac{\frac{9s^2-49t^2}{st}}{\frac{3}{t}-\frac{7}{s}}$ 13. _____

14. $\dfrac{1-\frac{3}{x}}{1+\frac{2}{x}}$ 14. _____

15. The express $\dfrac{y+5}{y-3}$ is defined for what values of y? 15. _____

Name _____ Date _____

Additional Exercises 8.5
Form II
Complex Rational Expressions

Simplify each complex expression.

1. $\dfrac{\frac{x}{7}}{\frac{4}{x+9}}$ 1. _____

2. $\dfrac{\frac{y}{5}}{\frac{3}{y+9}}$ 2. _____

3. $\dfrac{\frac{2}{y}}{\frac{9}{y+4}}$ 3. _____

4. $\dfrac{\frac{4}{y}}{\frac{6}{y+7}}$ 4. _____

5. $\dfrac{\frac{10}{5r-1}-10}{\frac{10}{5r-1}+10}$ 5. _____

6. $\dfrac{\frac{5}{x^2y}+\frac{2}{xy^2}}{\frac{7}{xy}-\frac{9}{x^2y^2}}$ 6. _____

7. $\dfrac{1-\frac{1}{x}-\frac{6}{x^2}}{1-\frac{4}{x^2}}$ 7. _____

Name _____ Date _____

8. $\dfrac{3+\dfrac{11}{x}+\dfrac{10}{x^2}}{3+\dfrac{5}{x}-\dfrac{12}{x^2}-\dfrac{20}{x^3}}$ 8. _____

9. $\dfrac{\dfrac{1}{x}+\dfrac{1}{3}}{\dfrac{1}{x}-\dfrac{1}{3}}$ 9. _____

10. $\dfrac{1-\dfrac{9}{x^2}}{1-\dfrac{1}{x}-\dfrac{6}{x^2}}$ 10. _____

11. $\dfrac{1}{x+\dfrac{1}{x}}$ 11. _____

12. $\dfrac{3-\dfrac{1}{a+3}}{3+\dfrac{1}{a+3}}$ 12. _____

13. $\dfrac{5+\dfrac{1}{x}}{5-\dfrac{1}{x}}$ 13. _____

14. $\dfrac{\dfrac{2x}{3}+2}{\dfrac{5x}{3}-\dfrac{15}{x}}$ 14. _____

15. The express $\dfrac{y+1}{2y-3}$ is defined for what values of y? 15. _____

Name _____ Date _____

Additional Exercises 8.5
Form III
Complex Rational Expressions

Simplify each complex expression.

1. $\dfrac{1-\dfrac{1}{x+1}}{1+\dfrac{1}{x-1}}$ 1. _____

2. $\dfrac{\dfrac{x-5}{x^2-4}}{\dfrac{x^2-25}{x+2}}$ 2. _____

3. $\dfrac{4-\dfrac{1}{y^2}}{\dfrac{1}{y^2}+\dfrac{4}{y}+4}$ 3. _____

4. $\dfrac{1-\dfrac{1}{x}-\dfrac{6}{x^2}}{1-\dfrac{9}{x^2}}$ 4. _____

5. $\dfrac{\dfrac{4a}{2a^3+2}}{\dfrac{8a}{4a+4}}$ 5. _____

6. $\dfrac{2+\dfrac{5}{x}-\dfrac{3}{x^2}}{2-\dfrac{5}{x}+\dfrac{2}{x^2}}$ 6. _____

7. $\dfrac{x-\dfrac{5x}{x+5}}{x+\dfrac{5x}{x-5}}$ 7. _____

Name _____ Date _____

8. $\dfrac{\dfrac{1}{x}-\dfrac{1}{3-3x}}{\dfrac{1}{1-x}-\dfrac{3}{x}}$ 8. _____

9. $\dfrac{\dfrac{x-y}{x+y}+\dfrac{y}{x}}{\dfrac{x}{y}-\dfrac{x-y}{x+y}}$ 9. _____

10. $\dfrac{\dfrac{1}{x-x^2}-\dfrac{1}{x^2+x}}{\dfrac{1}{x^2+1}-\dfrac{1}{x^2-1}}$ 10. _____

11. $\dfrac{\dfrac{4}{x+2}-\dfrac{4}{x-2}}{\dfrac{8}{x^2-4}}$ 11. _____

12. $\dfrac{x+5-\dfrac{14}{x}}{x+15+\dfrac{56}{x}}$ 12. _____

13. $\dfrac{\dfrac{1}{k+6}}{\dfrac{3}{k^2-36}}$ 13. _____

14. $\dfrac{\dfrac{4}{9r-1}-4}{\dfrac{4}{9r-1}+4}$ 14. _____

15. The express $\dfrac{y-\dfrac{2}{3}}{y+\dfrac{7}{8}}$ is defined for what values of y? 15. _____

Name _____ Date _____

Additional Exercises 8.6
Form I
Solving Rational Equations

Solve each rational equation.

1. $\frac{x}{8} - \frac{x}{9} = 2$ 1. _____

2. $\frac{41}{x} = 7 - \frac{1}{x}$ 2. _____

3. $\frac{3x}{2} + 2 = \frac{1}{4}$ 3. _____

4. $\frac{x+7}{8} = \frac{x+8}{9}$ 4. _____

5. $\frac{x-7}{3} = \frac{x+3}{7}$ 5. _____

6. $\frac{2}{3} = \frac{1}{x} + \frac{5}{6}$ 6. _____

7. $x + \frac{4}{x} = -5$ 7. _____

8. $\frac{x+2}{x-7} = 4$ 8. _____

Name _____ Date _____

9. $\frac{x}{8}=\frac{1}{8}+\frac{x}{12}$ 9. _____

10. $\frac{1}{x}+3=\frac{4}{3}$ 10. _____

11. $\frac{2a}{3}+\frac{5}{6}=\frac{3a}{2}$ 11. _____

12. $\frac{3x}{10}-\frac{1}{2}=\frac{x}{5}$ 12. _____

13. $\frac{3x}{8}=10-\frac{x}{4}$ 13. _____

14. $\frac{7x}{8}=\frac{11}{2}+\frac{3x}{5}$ 14. _____

15. $\frac{x}{6}=1+\frac{x+3}{5}$ 15. _____

Name _____ Date _____

Additional Exercises 8.6
Form II
Solving Rational Equations

Solve each rational equation.

1. $\frac{6x-2}{2x-1}=\frac{9x}{3x+1}$ 1. _____

2. $\frac{x}{x-3}+3=\frac{3}{x-3}$ 2. _____

3. $\frac{y+3}{2y}+\frac{5}{y-1}=\frac{1}{2}$ 3. _____

4. $\frac{5}{2x}+\frac{1}{12}=\frac{2}{x}$ 4. _____

5. $\frac{5}{x}=\frac{3}{x^2}-2$ 5. _____

6. $\frac{x}{10}-\frac{3}{5}=\frac{x-1}{5}$ 6. _____

7. $1+\frac{1}{x}=\frac{90}{x^2}$ 7. _____

8. $6=\frac{7}{x}+\frac{5}{x^2}$ 8. _____

Name _____ Date _____

9. $\frac{4y+1}{3}=\frac{3}{5}+\frac{2y+1}{5}$ 9. _____

10. $\frac{8}{x}-\frac{1}{4}=\frac{4}{x}$ 10. _____

11. $\frac{6}{x-8}=\frac{5}{x+8}$ 11. _____

12. $\frac{x-7}{x}=\frac{48}{x+7}$ 12. _____

13. $-2x=\frac{2x-8}{7}$ 13. _____

14. $\frac{5-a}{a}+\frac{3}{4}=\frac{7}{a}$ 14. _____

15. $\frac{x+4}{3}-\frac{x}{7}=\frac{x+7}{5}$ 15. _____

Name _____ Date _____

Additional Exercises 8.6
Form III
Solving Rational Equations

Solve each rational equation.

1. $\frac{x+3}{2} = \frac{x+4}{4}$ 1. _____

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

3. $\frac{5}{x-3} = 1 + \frac{30}{x^2-9}$ 3. _____

4. $\frac{4}{x-2} = \frac{5}{x+2} + \frac{2x-3}{x^2-4}$ 4. _____

5. $\frac{4}{2a-6} = \frac{12}{a^2-9} + \frac{12}{4a+12}$ 5. _____

6. $\frac{y+2}{y^2-y} = \frac{6}{y^2-1}$ 6. _____

7. $10 - \frac{1}{x} = \frac{3}{x^2}$ 7. _____

8. $\frac{2}{a+1} = \frac{5}{a} + \frac{3}{a+1}$ 8. _____

Name _____ Date _____

9. $\frac{2x}{x+1} = 2 - \frac{5}{2x}$ 9. _____

10. $\frac{7}{y+4} - \frac{2}{y-4} = \frac{14}{y^2-16}$ 10. _____

11. $\frac{m+5}{m^2-9m+20} - \frac{5}{m^2-8m+16} = \frac{m-5}{m^2-9m+20}$ 11. _____

12. $\frac{1}{x} + \frac{1}{x+4} = \frac{x+5}{x+4}$ 12. _____

13. $\frac{2}{t} = \frac{t}{5t-12}$ 13. _____

14. $\frac{x}{2x+2} = \frac{-2x}{4x+4} + \frac{2x-3}{x+1}$ 14. _____

15. $\frac{1}{x+7} + \frac{2}{x+3} = \frac{-4}{x^2+10x+21}$ 15. _____

Name _____ Date _____

Additional Exercises 8.7
Form I
Applications Using Rational Equations and Variation

1. A cyclist bikes at a constant speed for 20 miles. He then returns home at the same speed but takes a different route. His return trip takes one hour longer and is 25 miles. Find his speed

1. _____

2. A boat travels 8 miles upstream and then back 8 miles in 3 hours. The current of the river is 2 mph. What is the speed of the boat in still water?

2. _____

3. Mark and Rachel both work for Smith Landscaping Company. Mark can finish a planting job in 3 hours, while it takes Rachel 5 hours to finish the same job. If Mark and Rachel will work together on the job, and the cost of labor is $45 per hour, what should the labor estimate be? (Round to the nearest cent, if necessary.)

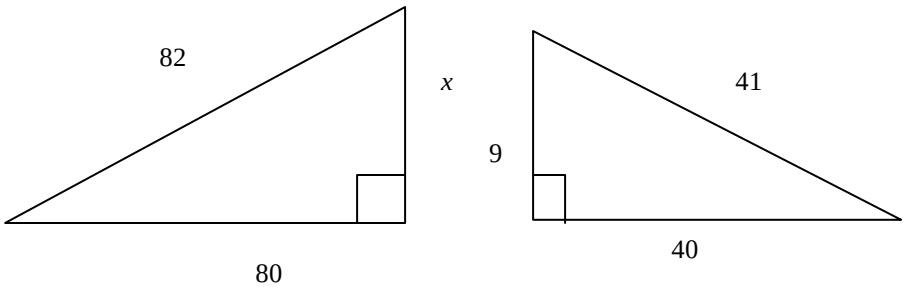
3. _____

4. One pump can drain a pool in 7 minutes. When a second pump is also used, the pool only takes 2 minutes to drain. How long would it take the second pump to drain the pool if it were the only pump in use?

4. _____

Find the missing length in the similar triangles.

5. 5. _____



Solve the following variation problems.

6. y varies directly as x. $y = 20$ when $x = 5$. Find y when $x = 3$. 6. _____

Name _____ Date _____

7. y varies directly as x. $y = 10$ when $x = 2$. Find y when $x = 6$. 7. _____

8. y varies inversely as x. $y = -10$ when $x = 6$. Find y when $x = -5$. 8. _____

9. y varies inversely as x. $y = 12$ when $x = 5$. Find y when $x = 6$. 9. _____

10. The amount of water used to take a shower is directly proportional to the amount of time that the shower is in use. A shower lasting 21 minutes requires 12.6 gallons of water. Find the amount of water used in a shower lasting 10 minutes. 10. _____

11. If the resistance in an electrical circuit is held constant, the amount of current flowing through the circuit is directly proportional to the amount of voltage applied to the circuit. When 9 volts are applied to a circuit, 180 milliamperes of current flow through the circuit. Find the new current if the voltage is increased to 11 volts. 11. _____

12. The amount of gas that a helicopter uses is directly proportional to the number of hours spent flying. The helicopter flies for 4 hours and uses 48 gallons of fuel. Find the number of gallons of fuel that the helicopter uses to fly for 5 hours. 12. _____

Name _____ Date _____

Additional Exercises 8.7
Form II
Applications Using Rational Equations and Variation

1. A car travels 400 miles on level terrain in the same amount of time it travels 160 miles on mountainous terrain. If the rate of the car is 30 miles per hour less in the mountains than on level ground, find its rate in the mountains. 1. _____

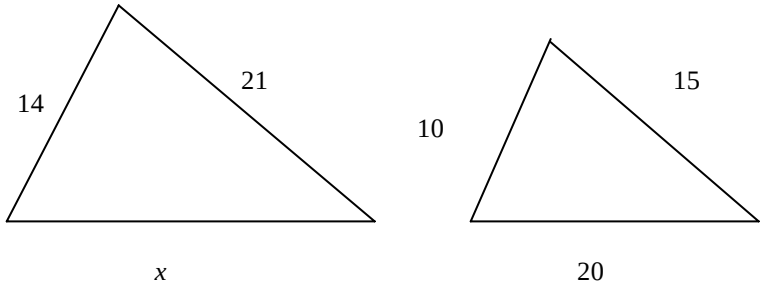
2. A boat travels 9 kilometers upstream in the same amount of time. it moves 16 kilometers downstream. If the rate of the current is 6 kilometers per hour, find the rate of the boat in still water. 2. _____

3. In a race, Car A starts 1 mile behind Car B. Car A is . traveling at 65 miles per hour, while Car B is traveling at 55 miles per hour. How long will it take for Car A to overtake Car B? 3. _____

4. One conveyor belt can move 1000 boxes in 11 minutes. Another can move 1000 boxes in 12 minutes. If another conveyor belt is added and all three are used, the boxes are moved in 3 minutes. How long would it take the third conveyor belt alone to do the same job? 4. _____

Find the missing length in the similar triangles.

5. 5. _____



Solve the following variation problems.

6. y varies directly as x. $y = 25$ when $x = 3$. Find y when $x = 12$. 6. _____

Name _____ Date _____

7. y varies directly as x. $y = 8$ when $x = 2$. Find y when $x = 5$. 7. _____

8. y varies inversely as x. $y = 0.125$ when $x = 8$. Find y when $x = 5$. 8. _____

9. y varies inversely as x. $y = \frac{2}{5}$ when $x = \frac{3}{5}$. Find y when $x = \frac{4}{5}$. 9. _____

10. A person's hair length varies proportionately with the number of weeks it has been growing. If Fred shaved his head bald and his hair was 0.2 inches long after 5 weeks, how long would it be after additional 6 weeks? (Round to the nearest hundredth of an inch.) 10. _____

11. When the temperature stays the same, the volume of a gas is inversely proportional to the pressure of the gas. If a balloon is filled with 145 cubic inches of a gas at a pressure of 14 pounds per square inch, find the new pressure of the gas if the volume is decreased to 29 cubic inches. 11. _____

12. The amount of time it takes a swimmer to swim a race is inversely proportional to the average speed of the swimmer. A swimmer finishes a race in 75 seconds with an average speed of 4 feet per second. Find the average speed of the swimmer if it takes 60 seconds to finish the race. 12. _____

Name _____ Date _____

Additional Exercises 8.7
Form III
Applications Using Rational Equations and Variation

1. The sports car travels 40 km/h faster than the loaded SUV and trailer. While the SUV travels 150 km, the sports car goes 350 km. Find their speeds. 1. _____

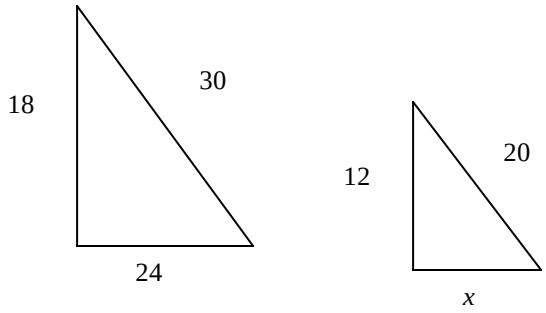
2. Jim can run 5 miles per hour on level ground on a still day. One windy day, he runs 15 miles with the wind, and in the same amount of time runs 4 miles against the wind. What is the rate of the wind? 2. _____

3. A painter can finish painting a house in 4 hours. Her assistant takes 6 hours to finish the same job. How long would it take for them to complete the job if they were working together? 3. _____

4. A baker can decorate the day's cookie supply four times as fast as his new assistant. If they decorate all the cookies working together in 12 minutes, how long would it take for each of them to decorate the cookies working individually? 4. _____

Find the missing length in the similar triangles.

5. 5. _____



Solve the following variation problems.

6. y varies directly as x. $y = 0.7$ when $x = 0.4$. Find y when $x = 0.8$. 6. _____

Name _____ Date _____

7. y varies directly as x. $y = 400$ when $x = 125$. Find y when $x = 500$. 7. _____

8. y varies inversely as x. $y = 0.2$ when $x = 0.3$. Find y when $x = 0.12$. 8. _____

9. y varies inversely as x. $y = 6.25$ when $x = 0.16$. Find y when $x = 0.9$. 9. _____

10. If the voltage, V, in an electric circuit is held constant, the current, I, is inversely proportional to the resistance, R. If the current is 120 milliamperes when the resistant is 5 ohms, find the current when the resistance is 30 ohms. 10. _____

11. While traveling at a constant speed in a car, the centrifugal acceleration passengers feel while the car is turning is inversely proportional to the radius of the turn. If the passengers feel an acceleration of 12 feet per second when the radius of the turn is 40 feet, find the acceleration the passengers feel when the radius of the turn is 120 feet. 11. _____

12. The length a spring stretches is directly proportional to the force applied. If a force of 5 pounds stretches a spring 3 inches, how much force is necessary to stretch the same spring 10 inches? 12. _____