Name _____ Date _____ Class _____

LESSON 5-3

Practice C

Adding and Subtracting Rational Expressions

Add or subtract. Identify any *x*-values for which the expression is undefined.

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

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

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

4. $\frac{3}{x-5}-\frac{1}{x^2-7x+10}$

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

6. $\frac{3x}{x^2-x-6}-\frac{5}{x^2-8x+15}$

Simplify. Assume all expressions are defined.

7. $\dfrac{\frac{x+4}{x^2-8}}{\frac{x+4}{x-2}}$

8. $\dfrac{\frac{x}{x+2}}{2x+\frac{x}{5}}$

9. $\dfrac{\frac{x-7}{x+2}}{\frac{x-5}{x+6}}$

10. $\dfrac{\frac{x-6}{x^2+3}}{\frac{x}{x^2+2x+1}}$

Solve.

11. The electric potential generated by a certain arrangement of electric charges is given by $\frac{e}{x-4}+\frac{e}{x+1}$, where e is the fundamental unit of electric charge and x measures the location where the potential is being measured. Express the electric potential as a rational expression.

b. $\frac{T_3}{T_2} = 1.067$

c. $\frac{T_3}{T_1} = 1.143$

4. D

5. A

Reading Strategies

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

   b. $x = 2$

   c. Because $x = 2$ makes the denominator of the expression equal to 0

2. a. $\frac{6x^3y^2}{7z^4} \cdot \frac{21z^2}{2xy^2}$

   b. $\frac{3x^2}{z^2} \cdot \frac{3}{1}$

   c. $\frac{9x^2}{z^2}$

   d. $z = 0$

3. a. $\frac{3(x-1)}{2(x+2)} \cdot \frac{4(x+2)}{9(x-1)}$

   b. $\frac{1}{1} \cdot \frac{2}{3}$

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

   d. The resulting expression is never undefined.

4. By multiplying the result by the divisor; if it is correct their product should be the dividend.

5-3 ADDING AND SUBTRACTING RATIONAL EXPRESSIONS

Practice A

1. $\frac{3x}{x+1}; x \neq -1$

2. $\frac{-2x+1}{2x-5}; x \neq \frac{5}{2}$

3. $12x^2$

4. $(x+1)(x+2)$

5. $\frac{6x+8}{x-4}$

6. $\frac{-2x^2+6x+12}{x^2+2x}$

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

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

9. $\frac{x^2}{6}$

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

11. 1

12. $\frac{5x}{x^2+4x+3}$

13. 54.5 miles per hour

Practice B

1. $15x^3y^6$

2. $(x-1)(x+2)(x-3)$

3. $\frac{6x-8}{x+4}; x \neq -4$

4. $\frac{-2x+14}{2x-5}; x \neq \frac{5}{2}$

5. $\frac{2x^2+7x+4}{x^2-x-12}; x \neq 4, x \neq -3$

6. $\frac{2x^2-5x-7}{x^2-3x-18}; x \neq 6, x \neq -3$

7. $\frac{x^2-4x+2}{x^2-2x-15}; x \neq -3, x \neq 5$

8. $\frac{-2x^2-3x+6}{x^2-7x-18}; x \neq -2, x \neq 9$

9. $\frac{x^2-4x+3}{x^2+11x+30}$

10. $\frac{12x-24}{x^3+3x^2+x+3}$

11. $2.6\overline{6}$ packages per hour

Practice C

1. $\frac{13x-2}{2x+6}; x \neq -3$

2. $\frac{x^2+28x}{3x^2(x+4)}; x \neq -4, x \neq 0$

3. $\frac{4x^2 - 2x - 4}{3x^2 - 11x - 4}$; $x \neq -\frac{1}{3}$ and $x \neq 4$

4. $\frac{3x - 7}{x^2 - 7x + 10}$; $x \neq 5, x \neq 2$

5. $\frac{8x^2 + 4x - 3}{8x^2 - 2}$; $x \neq \pm\frac{1}{2}$

6. $\frac{3x^2 - 20x - 10}{x^3 - 6x^2 - x + 30}$; $x \neq -2, x \neq 3, x \neq 5$

7. $\frac{x - 2}{x^2 - 8}$

8. $\frac{5}{11x + 22}$

9. $\frac{x^2 - x - 42}{x^2 - 3x - 10}$

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

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

Reteach

1. $\frac{4x - 3}{x^2 - 4}$; –2, 2

2. $\frac{3x - 4}{x + 3}$; –3

3. $\frac{-3x - 5}{x - 1}$; 1

4. $\frac{3x + 10}{3x + 7}$; $-\frac{7}{3}$

5. $\frac{3}{x - 3}$; 3

6. $\frac{2x + 9}{x^2 - 1}$; ±1

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

   $x \neq -2, 2$

8. $\frac{4x - 1}{(x + 2)(x + 1)} + \frac{3}{x + 1}\left(\frac{x + 2}{x + 2}\right)$

   $\frac{4x - 1 + 3x + 6}{(x + 2)(x + 1)}$

   $\frac{7x + 5}{(x + 2)(x + 1)}$

   $x \neq -2, -1$

9. $(x - 3)(x + 3)(x + 2)$

Challenge

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

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

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

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

Problem Solving

1. a. $\frac{d}{6} + \frac{d}{3}$

   b. $2d$

   c. $\frac{2d}{\frac{d}{6} + \frac{d}{3}}$

   d. Vicki is correct. Possible answer: Lorena calculated the average speed as if it took the same amount of time for each leg of the trip. Vicki took into consideration the time for each leg.

2. 4.8 knots

3. D

4. C

5. B

6. D

Reading Strategies

1. $6x^6$

2. $10x^4y^3$

3. $(x - 8)(x + 1)$

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

5. $\frac{8x}{x - 3} \div \frac{x^2}{2}; \frac{8x}{x - 3} \cdot \frac{2}{x^2}$

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