

**LESSON**  
**6-3**

**Practice B**

***Adding and Subtracting Rational Expressions***

**Find the least common multiple for each pair.**

1.  $3x^2y^6$  and  $5x^3y^2$

2.  $x^2 + x - 2$  and  $x^2 - x - 6$

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

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

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

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

6.  $\frac{3x^2-1}{x^2-3x-18} - \frac{x+2}{x-6}$

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7.  $\frac{x+2}{x^2-2x-15} + \frac{x}{x+3}$

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

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**Simplify. Assume all expressions are defined.**

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

10.  $\frac{\frac{12}{x+3}}{\frac{x^2+1}{x-2}}$

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**Solve.**

11. A messenger is required to deliver 10 packages per day. Each day, the messenger works only for as long as it takes to deliver the daily quota of 10 packages. On average, the messenger is able to deliver 2 packages per hour on Saturday and 4 packages per hour on Sunday. What is the messenger's average delivery rate on the weekend?

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## Challenge

- $x^{2y} - 3$
- $\frac{5x^{2a}}{x^a - y^a}$
- $j - k$
- 1
- $\frac{2(2a+1)}{a+7}$
- $\frac{p+1}{p(p-1)}$
- $\frac{(m+n)^2}{n-m}$
- $\frac{a^n - 1}{a^n + 4}$
- $\frac{z^2}{4(y-x)}$
- $y = \frac{7-x}{x-3}; x \neq -3 \text{ or } 3$

- $\frac{3x^2}{z^2} \cdot \frac{3}{1}$
  - $\frac{9x^2}{z^2}$
  - $z = 0$
- $\frac{3(x-1)}{2(x+2)} \cdot \frac{4(x+2)}{9(x-1)}$
    - $\frac{1}{1} \cdot \frac{2}{3}$
    - $\frac{2}{3}$
  - The resulting expression is never undefined.
  - By multiplying the result by the divisor; if it is correct their product should be the dividend.

## Problem Solving

- $T_1 = 2\pi r_1$
  - $T_2 = 2\pi(r_1 + 5)$
  - $\frac{r_1 + 5}{r_1}$

$$2. \text{ a. } \frac{(r_1 + 10)(r_1 - 5)}{(r_1^2 - 25)} = \frac{(r_1 + 10)(r_1 - 5)}{(r_1 + 5)(r_1 - 5)} = \frac{r_1 + 10}{r_1 + 5};$$

Mari is correct.

- $\frac{T_2}{T_1} = 1.071$
  - $\frac{T_3}{T_2} = 1.067$
  - $\frac{T_3}{T_1} = 1.143$

- D
- A

## Reading Strategies

- $\frac{x}{x-2}$
  - $x = 2$
  - Because  $x = 2$  makes the denominator of the expression equal to 0
- $\frac{6x^3y^2}{7z^4} \cdot \frac{21z^2}{2xy^2}$

## 6-3 ADDING AND SUBTRACTING RATIONAL EXPRESSIONS

### Practice A

- $\frac{3x}{x+1}; x \neq -1$
- $\frac{-2x+1}{2x-5}; x \neq \frac{5}{2}$
- $12x^2$
- $(x+1)(x+2)$
- $\frac{6x+8}{x-4}$
- $\frac{-2x^2+6x+12}{x^2+2x}$
- $\frac{4x+3}{x^2-3x-4}$
- $\frac{-x+2}{x^2-1}$
- $\frac{x^2}{6}$
- $\frac{2}{x^2+5x}$
- 1
- $\frac{5x}{x^2+4x+3}$

- 54.5 miles per hour

### Practice B

- $15x^3y^6$
- $(x-1)(x+2)(x-3)$
- $\frac{6x-8}{x+4}; x \neq -4$
- $\frac{-2x+14}{2x-5}; x \neq \frac{5}{2}$

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

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

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

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

$$9. \frac{x^2 - 4x + 3}{x^2 + 11x + 30} \quad 10. \frac{12x - 24}{x^3 + 3x^2 + x + 3}$$

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

### Practice C

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

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

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

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

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

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

$$7. \frac{x - 2}{x^2 - 8} \quad 8. \frac{5}{11x + 22}$$

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

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

### Review for Mastery

$$1. \frac{4x - 3}{x^2 - 4}; -2, 2$$

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

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

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

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

$$6. \frac{2x + 9}{x^2 - 1}; \pm 1$$

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

$$x \neq -2, 2$$

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

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

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

$$x \neq -2, -1$$

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

### 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.

$$2. 4.8 \text{ knots}$$

$$3. D$$

$$4. C$$

$$5. B$$

$$6. D$$