

**1.5 Simplifying Rational Expressions***McGraw-Hill Ryerson: MATHEMATICS 11, pp. 35–43*

- To simplify a rational expression, factor both the numerator and the denominator and divide by any common factors.
- To find the restrictions on the variable(s) in a rational expression, set the denominator equal to zero. The restrictions are any values of the variable(s) that satisfy this equation

1. Simplify each rational expression. State restrictions on the variable.

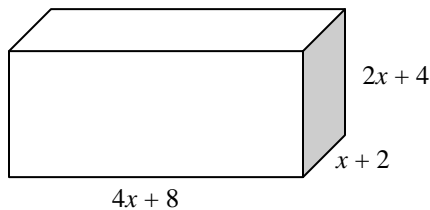
a)  $\frac{15a}{39a^2}$

b)  $\frac{4x^4 - 72x^3 + 16x^2}{4x^2}$

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

d)  $\frac{x+5}{x^2+x-20}$

2. **Rectangular prism** Find the ratio of the volume to the surface area of the rectangular prism shown. Simplify, if possible.

**1.6 Multiplying & Dividing Rational Expressions***McGraw-Hill Ryerson: MATHEMATICS 11, pp. 44–52*

- For rational expressions  $\frac{P}{Q}$  and  $\frac{R}{S}$ ,  $\frac{P}{Q} \times \frac{R}{S} = \frac{PR}{QS}$ ,  $Q, S \neq 0$  and  $\frac{P}{Q} \div \frac{R}{S} = \frac{PS}{QR}$ ,  $Q, R, S \neq 0$ .
- Simplify the results of these operations by factoring all numerators and denominators and dividing by any common factors.

3. Simplify each expression. State any restrictions on the variables.

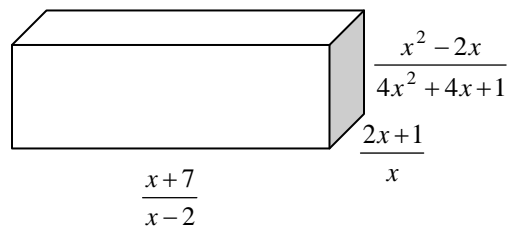
a)  $\frac{35}{16x^2} \div \frac{21}{4x}$

b)  $\frac{2a^2}{5b^2c} \times \frac{3bc^2}{8a^2}$

c)  $\frac{3x+6}{7x-7} \times \frac{14x-14}{5x+10}$

d)  $\frac{a-1}{2a-3} \div \frac{1-a}{4a-6}$

4. Write the volume of the rectangular prism in its simplest form.



## 1.7 Adding and Subtracting Rational Expressions, I

McGraw-Hill Ryerson: *MATHEMATICS 11*, pp. 53–61

- If rational expressions have a common denominator, write the numerators over the common denominator, and add or subtract the numerators.
- If rational expressions have different denominators, first rewrite the rational expressions with a common denominator. Then, write the numerators over the common denominator, and add or subtract the numerators.

5. Simplify. State any restrictions on the variables.

a)  $\frac{-5}{3x-5} + \frac{3x}{3x-5}$

b)  $\frac{x}{7} - \frac{2x}{9}$

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

d)  $\frac{x^2+4x-13}{-2x^2+5x-3} - \frac{3x^2+1-2x}{3-5x+2x^2}$

6. Find expressions for the perimeter of each rectangle.

a)

$$\frac{12x}{7x-2y}$$



b)

$$\frac{4a+5b}{3a+7b}$$



$$\frac{13y}{7x-2y}$$

$$\frac{2a+9b}{3a+7b}$$

## 1.8 Adding and Subtracting Rational Expressions, II

McGraw-Hill Ryerson: *MATHEMATICS 11*, pp. 62–69

- If the expressions already have a common polynomial denominator, write the numerators over the common denominator, and add or subtract the numerators.
- If the expressions have different polynomial denominators, first rewrite the rational expressions with a common denominator. Then, write the numerators over the common denominator, and add or subtract the numerators.

7. Simplify. State any restrictions on the variables.

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

b)  $\frac{3r}{r+3} + \frac{5r}{2r-6}$

c)  $\frac{2t}{t^2-4} + \frac{5}{t+2}$

d)  $\frac{x+6}{x^2+9x+18} + \frac{x-3}{x^2+2x-3}$

8. a) Find the result of subtracting  $\frac{2}{x+1}$  from  $\frac{6}{x-2}$ .

b) Find the result of subtracting  $\frac{6}{x-2}$  from  $\frac{2}{x+1}$ .

c) How are the results in a) and b) related?