

## EXAMPLE 2 Simplify a complex fraction

Simplify  $\frac{\frac{2x^2 - 8x}{x^2 + 4x + 4}}{\frac{x^3 - 16x}{x + 2}}$ .

$$\begin{aligned} \frac{\frac{2x^2 - 8x}{x^2 + 4x + 4}}{\frac{x^3 - 16x}{x + 2}} &= \frac{2x^2 - 8x}{x^2 + 4x + 4} \div \frac{x^3 - 16x}{x + 2} \\ &= \frac{2x^2 - 8x}{x^2 + 4x + 4} \cdot \frac{x + 2}{x^3 - 16x} \\ &= \frac{(2x^2 - 8x)(x + 2)}{(x^2 + 4x + 4)(x^3 - 16x)} \\ &= \frac{2x(x-4)(x+2)}{(x+2)(x+2)x(x+4)(x-4)} \\ &= \frac{2}{(x+2)(x+4)} \end{aligned}$$

Write fraction as quotient.

Multiply by multiplicative inverse.

Multiply numerators and denominators.

Factor and divide out common factors.

Simplify.

## PRACTICE

### EXAMPLES 1 and 2

on pp. 810–811  
for Exs. 1–9

Simplify the complex fraction.

1.  $\frac{\frac{-9x^5}{7}}{-12x^2}$

2.  $\frac{\frac{-2}{11x^4}}{18x^4}$

3.  $\frac{\frac{x^2 + 7x}{2x - 6}}{x^2 - 49}$

4.  $\frac{\frac{-24x^4}{8x^2}}{-4x^3}$

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

6.  $\frac{\frac{2x^2 + 5x - 3}{x^2 + 4x + 3}}{15x}$

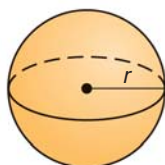
7.  $\frac{\frac{x^2 - x - 20}{4}}{\frac{x - 5}{10}}$

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

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

**GEOMETRY** Write a rational expression for the ratio of the surface area  $S$  of the given solid to its volume  $V$ .

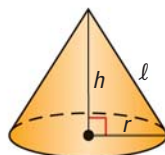
10. Sphere



$$S = 4\pi r^2$$

$$V = \frac{4\pi r^3}{3}$$

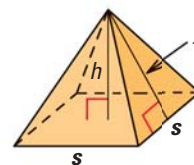
11. Cone



$$S = \pi r^2 + \pi r \ell$$

$$V = \frac{\pi r^2 h}{3}$$

12. Pyramid with a square base



$$S = s^2 + 2sl$$

$$V = \frac{s^2 h}{3}$$

13. Are the complex fractions  $\frac{a}{\frac{b}{c}}$  and  $\frac{\frac{a}{b}}{c}$  equivalent? Explain your answer.