

# 1-4 Applied Calculus Solutions

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Simplify each expression

1.  $x^3 x^5$

$$x^{3+5} = x^8$$

3.  $(x^3)^4$

$$x^{(3)(4)} = x^{12}$$

5.  $(2x^2)^3 x^4$

$$(2^3)(x^2)^3 x^4 = (8)(x^{(2)(3)})x^4 = 8x^6 x^4 = 8x^{6+4} = 8x^{10}$$

7.  $\frac{(3x^2)^2}{6x^3}$

$$\frac{3^2(x^2)^2}{6x^3} = \frac{9x^{(2)(2)}}{6x^3} = \frac{9x^4}{6x^3} = \frac{3x}{2}$$

Simplify, and rewrite without negative exponents

9.  $4x^{-3}$

$$\frac{4}{x^3}$$

$$11. x^{-4}x^2$$

$$x^{-4+2} = x^{-2} = \frac{1}{x^2}$$

$$13. \frac{5x^{-3}}{2x^{-6}}$$

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

Rewrite using negative or fractional exponents

$$15. \frac{4}{x^{-5}}$$

This exercise is confusing. The given expression already has a negative exponent. As shown below, it can be written **without** a negative exponent.

$$4x^{-(-5)} = 4x^5$$

$$17. 3\sqrt{x}$$

$$3x^{\frac{1}{2}}$$

$$19. \frac{4}{\sqrt[3]{x}}$$

$$\frac{4}{x^{1/3}} = 4x^{-1/3}$$

Rewrite as a radical

21.  $4x^{-1/2}$

$$\frac{4}{x^{1/2}} = \frac{4}{\sqrt{x}} = \frac{\sqrt{16}}{\sqrt{x}} = \sqrt{\frac{16}{x}}$$

23.  $2x^{1/3}$

$$2\sqrt[3]{x} = (\sqrt[3]{8})(\sqrt[3]{x}) = \sqrt[3]{8x}$$

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These solutions were created by Donald R. Goral from exercises in *Applied Calculus, Edition 1* by Shana Calaway, Dale Hoffman, David Lippman

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