1-4 Applied Calculus Solutions

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Simplify each expression

1. $x^3 x^5$

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

3. $\left(x^3\right)^4$

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

5. $\left(2x^2\right)^3 x^4$

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

7. $\dfrac{\left(3x^2\right)^2}{6x^3}$

$\dfrac{3^2\left(x^2\right)^2}{6x^3} = \dfrac{9x^{(2)(2)}}{6x^3} = \dfrac{9x^4}{6x^3} = \dfrac{3x}{2}$

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

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

Rewrite using negative or fractional exponents

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

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. $\dfrac{4}{\sqrt[3]{x}}$

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

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. $2x^{1/3}$

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

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