

Chapter 1 Real Numbers

Lesson 1-4 Powers of Monomials

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- 13** A shipping box is in the shape of a cube. Each side measures $3c^6d^2$ inches. Express the volume of the cube as a monomial.

The formula for the volume of a cube is $V = s^3$, where s is the length of each side.

$$\begin{aligned}(3c^6d^2)^3 &= 3^3(c^6)^3 (d^2)^3 && \text{Power of a product.} \\ &= 3^3 \cdot c^{6 \cdot 3} \cdot d^{2 \cdot 3} && \text{Power of a power} \\ &= 27c^{18}d^6 && \text{Simplify.}\end{aligned}$$

The volume of the box is $27c^{18}d^6$ cubic units.

- 17** Simplify $(-2v^7)^3(-4v^2)^4$. Show your work.

$$\begin{aligned}(-2v^7)^3(-4v^2)^4 &= (-2)^3(v^7)^3(-4)^4(v^2)^4 && \text{Power of a product.} \\ &= -8 \cdot v^{(7 \cdot 3)} \cdot 256 \cdot v^{(2 \cdot 4)} && \text{Power of a power.} \\ &= -2,048v^{(7 \cdot 3) + (2 \cdot 4)} && \text{Commutative Property} \\ &= -2,048v^{21+8} && \text{Multiply.} \\ &= -2,048v^{29} && \text{Add.}\end{aligned}$$