

**Key Concept and Vocabulary**

**Product of Powers Property:**

$$a^m \cdot a^n = a^{m+n}$$

**Power of a Power Property**

$$(a^m)^n = a^{mn}$$

**Power of Quotient Property:**

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, \text{ where } b \neq 0$$

**Zero Exponents**

$$a^0 = 1, \text{ where } a \neq 0$$

**Quotient of Powers Property:**

$$\frac{a^m}{a^n} = a^{m-n}, \text{ where } a \neq 0$$

**Power of a Product Property**

$$(ab)^m = a^m b^m$$

**Negative Exponents:**

$$a^{-n} = \frac{1}{a^n}, \text{ where } a \neq 0$$



**Skill Examples**

1.  $x^2 \cdot x^4 = x^{2+4} = x^6$

2.  $(w^5)^3 = w^{5 \cdot 3} = w^{15}$

3.  $\frac{y^6}{y^6} = y^{6-6} = y^0 = 1$

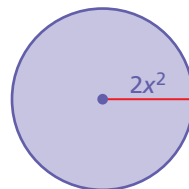
4.  $\left(\frac{c}{2}\right)^3 = \frac{c^3}{2^3} = \frac{c^3}{8}$

5.  $4g^{-3} = \frac{4}{g^3}$

**Application Example**

6. Write the area of the circle as a monomial.

$$\begin{aligned} \text{Area} &= \pi r^2 \\ &= \pi(2x^2)^2 \\ &= \pi(2^2)(x^2)^2 \\ &= 4\pi x^4 \end{aligned}$$



- The area of the circle is  $4\pi x^4$  square units.



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Check your answers at [BigIdeasMath.com](http://BigIdeasMath.com).

Simplify the expression using only positive exponents.

7.  $\frac{v^7}{v^4} = \underline{\hspace{2cm}}$

8.  $(q^2)^5 = \underline{\hspace{2cm}}$

9.  $r^3 \cdot r^3 = \underline{\hspace{2cm}}$

10.  $(3h)^3 = \underline{\hspace{2cm}}$

11.  $\left(\frac{5}{x^2}\right)^2 = \underline{\hspace{2cm}}$

12.  $(2k^{-3})^2 = \underline{\hspace{2cm}}$

13. **CUBE** Write the volume of the cube as a monomial.

$V = \underline{\hspace{4cm}}$

