

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:

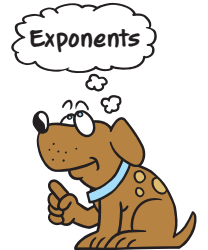
$$\frac{a^m}{a^n} = a^{m-n}, \text{ where } a \neq 0$$

Power of a Product Property

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

Negative Exponents:

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



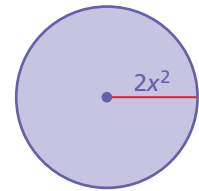
Skill Examples

- $x^2 \cdot x^4 = x^{2+4} = x^6$
- $(w^5)^3 = w^{5 \cdot 3} = w^{15}$
- $\frac{y^6}{y^6} = y^{6-6} = y^0 = 1$
- $\left(\frac{c}{2}\right)^3 = \frac{c^3}{2^3} = \frac{c^3}{8}$
- $4g^{-3} = \frac{4}{g^3}$

Application Example

- 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.

PRACTICE MAKES PURR-FECT™



Check your answers at BigIdeasMath.com.

Simplify the expression using only positive exponents.

7. $\frac{v^7}{v^4} = \underline{v^3}$

8. $(q^2)^5 = \underline{q^{10}}$

9. $r^3 \cdot r^3 = \underline{r^6}$

10. $(3h)^3 = \underline{27h^3}$

11. $\left(\frac{5}{x^2}\right)^2 = \underline{\frac{25}{x^4}}$

12. $(2k^{-3})^2 = \underline{\frac{4}{k^6}}$

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

$V = \underline{64x^6 \text{ cubic units}}$

