REVIEW: Properties of Exponents

Name _____

Key Concept and Vocabulary

Product of Powers Property:

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

Power of a Power Property

$(a^m)^n \cdot a^{mn}$

Power of Quotient Property:

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

Zero Exponents

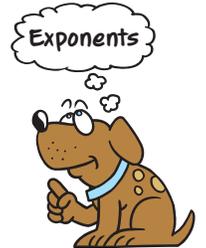$a^0 = 1$, where $a \neq 0$

Quotient of Powers Property:

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

Power of a Product Property

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

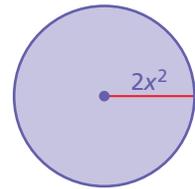**Negative Exponents:**

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

Skill Examples

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

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

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

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

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

Application Example

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

Area $= \pi r^2$

$\qquad = \pi\left(2x^2\right)^2$

$\qquad = \pi\left(2^2\right)\left(x^2\right)^2$

$\qquad = 4\pi x^4$

$2x^2$

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

PRACTICE MAKES *PURR*-FECT™

Simplify the expression using only positive exponents.

7. $\dfrac{v^7}{v^4} =$ _____

8. $\left(q^2\right)^5 =$ _____

9. $r^3 \cdot r^3 =$ _____

10. $(3h)^3 =$ _____

11. $\left(\dfrac{5}{x^2}\right)^2 =$ _____

12. $\left(2k^{-3}\right)^2 =$ _____

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

$V =$ _____

$4x^2$

$4x^2$

$4x^2$