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

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

Power of Quotient Property:

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

Zero Exponents

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

Quotient of Powers Property:

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

Power of a Product Property

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

Negative Exponents:

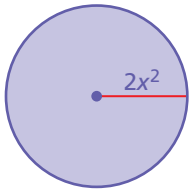
$a^{-n} = \frac{1}{a^n}$, where $a \neq 0$

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.



Area $= \pi r^2$

$= \pi(2x^2)^2$

$= \pi(2^2)(x^2)^2$

$= 4\pi x^4$

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

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Check your answers at BigIdeasMath.com.

Simplify the expression using only positive exponents.

7. $\frac{v^7}{v^4} =$ v^3
8. $(q^2)^5 =$ q^{10}
9. $r^3 \cdot r^3 =$ r^6
10. $(3h)^3 =$ $27h^3$
11. $\left(\frac{5}{x^2}\right)^2 =$ $\frac{25}{x^4}$
12. $(2k^{-3})^2 =$ $\frac{4}{k^6}$

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

$V =$ $64x^6$ cubic units