

Do Now: Simplify the expression.

$$1) (-5)^{-3} = \frac{1}{(-5)^3} = \frac{1}{-5 \cdot (-5) \cdot (-5)} = \frac{1}{-125}$$

$$2) 6^2 = 6 \cdot 6 = 36$$

$$3) (-3)^4 = -3(-3)(-3)(-3) = 9 \cdot 9 = 81$$

$$4) 2^{-5} = \frac{1}{2^5} = \frac{1}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} = \frac{1}{32}$$

12.5 Other Rules of Exponents

7.NS
8.EE

- SWBAT simplify powers of products and quotients.
- SWBAT understand ways of representing numbers.

- Calculators: No

Power of a Product Property

$$(\underline{ab})^m = a^m b^m$$

Multiplication

$$a \cdot b^m$$

$$(a \cdot b)^m = a^m b^m$$

Ex: $(3 \cdot 4)^5 = 3^5 \cdot 4^5$

Power of a Quotient Property

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$$

Ex: $\left(\frac{3}{4}\right)^5 = \frac{3^5}{4^5}$

Simplify the expression.

a) $(-2x)^3 = (-2)^3 \cdot x^3 = -8x^3$
 $(-2)(-2)(-2)$

b) $(5y)^2 = 5^2 \cdot y^2 = 25y^2$

c) $(ab)^{12} = a^{12}b^{12}$

Simplify the expression.

a) $(5y)^4 = 5^4 y^4 = 625y^4$
 $5 \cdot 5 \cdot 5 \cdot 5 = 25 \cdot 25 = 625$

b) $(-10g)^3 = (-10)^3 \cdot g^3 = -1000g^3$

c) $(-wx)^6 = (-w)^6 \cdot x^6 = w^6 x^6$
 $(-w)(-w)(-w)(-w)(-w)(-w) = w^6$

d) $-(wx)^6 = (-1)(wx)^6 = (-1)(w^6 x^6) = -(w^6 \cdot x^6) = -(w^6)(x^6)$

Simplify the expression.

a) $\left(\frac{m}{n}\right)^7 = \frac{m^7}{n^7}$

b) $\left(\frac{-3}{k}\right)^5 = \frac{-3 \cdot -3 \cdot -3 \cdot -3 \cdot -3}{k \cdot k \cdot k \cdot k \cdot k} = \frac{-243}{k^5}$
 $81 \cdot 3 = 243$

Simplify the expression.

a) $\left(\frac{x}{2y}\right)^2 = \frac{x^2}{(2y)^2} = \frac{x^2}{2^2 y^2} = \frac{x^2}{4y^2}$

b) $\left(\frac{-5}{3b}\right)^3 = \frac{(-5)^3}{(3b)^3} = \frac{-125}{3^3 b^3} = \frac{-125}{27b^3}$

Power of a Power Property

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

Ex: $(7^2)^3 = 7^{2 \cdot 3} = 7^6$

Simplify the expression. Write your answer using positive exponents.

a) $(10^3)^3 = 10^{3 \cdot 3} = 10^9$

b) $\left(\frac{t^5}{-w}\right)^3 = \frac{(t^5)^3}{(-w)^3} = \frac{t^{5 \cdot 3}}{(-w)^3} = \frac{t^{15}}{-w^3}$

c) $(p^{-4})^5 = p^{-4(5)} = p^{-20} = \frac{1}{p^{20}}$

Simplify the expression. Write your answer using positive exponents.

a) $(c^5)^4$

b) $\left(\frac{p^4}{q^3}\right)^2$

c) $(d^{-3})^{-1}$

$$\left(\frac{t^5}{-w}\right)^3$$

The square pages of the world's tiniest book are about 2.5×10^{-3} meter on each side. What is the approximate area of one page of this book?

A city park is 1.4×10^3 meters on each side. What is the approximate area of this park?

Exit Pass 12.5

Explain the difference between $2x$ and $(2x)^3$.

"Don't blame the sea if you cannot catch a fish."

Working individually or with a partner, complete the workbook.

Workbook pg.



Reflection of Today's Lesson**12.5 Other Rules of Exponents**

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- Calculators: No

Homework

pg. 677 #13-28, 36-43

