Section 8.2 : Product of Powers Property
In Class Notes

Name: _____

Key Ideas

Product of Powers Property

Words To multiply powers with the same base, add their exponents.

Numbers $4^2 \cdot 4^3 = 4^{2+3} = 4^5$

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

Power of a Power Property

Words To find a power of a power, multiply the exponents.

Numbers $(4^6)^3 = 4^{6 \cdot 3} = 4^{18}$

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

Power of a Product Property

Words To find a power of a product, find the power of each factor and multiply.

Numbers $(3 \cdot 2)^5 = 3^5 \cdot 2^5$

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

Common Error

When multiplying powers, do not multiply the bases.

$4^2 \cdot 4^3 = 4^5$, not 16^5.

Multiplying Powers with the Same Base

Ex:) Multiply. Leave answers in exponential form.

Notes:

a. $2^4 \cdot 2^5$

When a number is written without an exponent, its exponent is 1.

b. $-5 \cdot (-5)^6$

c. $x^3 \cdot x^7$

OYO:) Multiply. Leave answers in exponential form. Notes:

a. $6^2 \cdot 6^4$

b. $\left(-\frac{1}{2}\right)^3 \cdot \left(-\frac{1}{2}\right)$

Finding a Power of a Power

Ex:) Simplify. Leave answers in exponential form. Notes:

a. $\left(3^4\right)^3$

b. $\left(w^5\right)^4$

OYO:) Simplify. Leave answers in exponential form. Notes:

a. $\left(4^3\right)^5$

b. $\left(-4^3\right)^2$

Finding a Power of a Product

Ex:) Simplify the expression. Notes:

a. $(2x)^3$

b. $(3xy)^2$

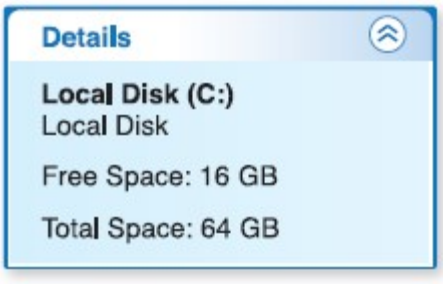
OYO:) Simplify the expression. Notes:

a. $(5y)^4$

b. $(0.5mn)^2$

Modeling Real Life

Ex:) One gigabyte (GB) of computer storage space is 2^{30} bytes. The storage details of a computer are shown. How many bytes of total storage space does the computer have? Notes:



OYO:) A newborn blue whale weighs 3^7 kilograms. Notes:
An adult blue whale weighs 81 times the weight of the newborn.
How many kilograms does the adult blue whale weigh?