Warm-up

Write each expression using an exponent.

1.) $2 \cdot 2 \cdot 2$

2.) $x \cdot x \cdot x \cdot x$

3.) $\frac{1}{4 \cdot 4}$

Write each expression without using an exponent.

4.) 4^3

5.) y^2

6.) m^{-4}

The speed of sound at sea level is about 344 meters per second.

The speed of light is about 8.7×10^5 times faster than the speed of sound.

What is the speed of light in meters per second?

http://www.acs.psu.edu/drussell/Demos/doppler/doppler.html

Activity 1

Copy and complete the table below.

$3^2 \cdot 3^3 = (3 \cdot 3)(3 \cdot 3 \cdot 3) = 3^{\square}$

$5^4 \cdot 5^2 = (\square \cdot \square \cdot \square \cdot \square)(\square \cdot \square) = 5^{\square}$

$4^3 \cdot 4^3 = (\square \cdot \square \cdot \square)(\square \cdot \square \cdot \square) = 4^{\square}$

$2^3 \cdot 2^2 = (\quad)(\quad) =$

$6^3 \cdot 6^4 = (\quad)(\quad) =$

Product of Powers Property

The product of two powers with the same base equals that base raised to the sum of the exponents.

Applying the Property

If the powers have the same base, keep the base and add the exponents.

$$3^2 \cdot 3^4 = 3^{2+4} = 3^6$$

Use the Product of Powers Property to write each product below as a single power.

$5^3 \cdot 5^5$

$7^2 \cdot 7^2$

$10^8 \cdot 10^4$

$8^7 \cdot 8^3$

Activity 2

Copy and complete the table below.

$(2^3)^2 = 2^3 \cdot 2^3 = (\square \cdot \square \cdot \square)(\square \cdot \square \cdot \square) = 2^{\square}$

$(2^2)^3 = \square \cdot \square \cdot \square = (\square \cdot \square)(\square \cdot \square)(\square \cdot \square) = \square^{\square}$

$(4^2)^4 = \square \cdot \square \cdot \square \cdot \square = (\square \cdot \square)(\square \cdot \square)(\square \cdot \square)(\square \cdot \square) = \square^{\square}$

$(3^4)^2 = \square \cdot \square = (\square \cdot \square \cdot \square \cdot \square)(\square \cdot \square \cdot \square \cdot \square) = \square^{\square}$

$(6^3)^4 =$

Power of a Power Property

A power raised to another power equals that base raised to the product of the exponents.

Applying the Property

If a power is being raised to another power, keep the base and multiply the exponents.

$$(3^2)^4 = 3^{2 \cdot 4} = 3^8$$

Use the Power of a Power Property to write each product below as a single power.

$(5^3)^2$

$(7^2)^2$

$(3^3)^4$

$(9^7)^3$

Activity 3

Copy and complete the table below.

$(ab)^3 = (ab)(ab)(ab) = (a\ \ a\ \ a)(b\ \ b\ \ b) = a\ \ b$

$(mn)^4 = (\ \ )(\ \ )(\ \ )(\ \ ) = (\ \cdot\ \cdot\ \cdot\ )(\ \cdot\ \cdot\ \cdot\ ) =$

$(xy)^2 = (\ \ )(\ \ ) = (\ \cdot\ )(\ \cdot\ ) =$

$(cd)^5 = (\ \ )(\ \ )(\ \ )(\ \ )(\ \ ) = (\ \cdot\ \cdot\ \cdot\ \cdot\ )(\ \cdot\ \cdot\ \cdot\ \cdot\ )$

$=$

$(pq)^6 =$

Power of a Product Property

A product raised to a power equals the product of each factor raised to that power.

Applying the Property

If a product is being raised to a power, separate the factors and raise each to that power.

$$(ab)^4 = (a \cdot a \cdot a \cdot a)(b \cdot b \cdot b \cdot b) = a^4b^4$$

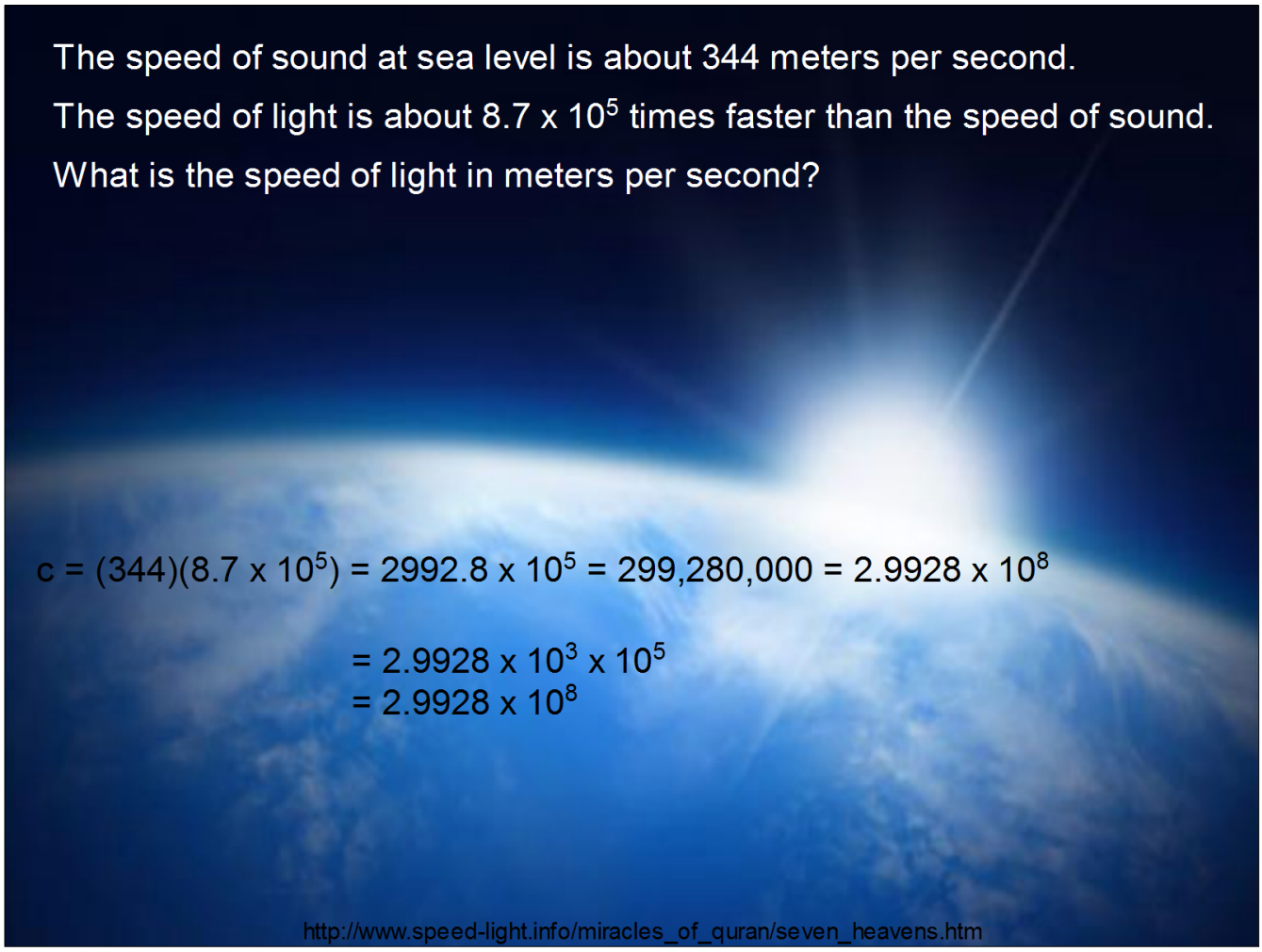
Use the Power of a Product Property to write each product below as a single power.

$(rs)^8$

$(yz)^9$

$(ab)^7$

$(2x)^5$


The speed of sound at sea level is about 344 meters per second.
The speed of light is about 8.7 x 10^5 times faster than the speed of sound.
What is the speed of light in meters per second?
c = (344)(8.7 x 10^5) = 2992.8 x 10^5 = 299,280,000 = 2.9928 x 10^8
= 2.9928 x 10^3 x 10^5
= 2.9928 x 10^8
http://www.speed-light.info/miracles_of_quran/seven_heavens.htm

a.) $(2^3)^3$

b.) $(b^4)^6 \cdot b$

c.) $(3x)^3$

d.) $(-4x^3)^4$

e.) $(3^6)^0$

f.) $b \cdot (a^3)^4 \cdot (b^{-2})^3$

g.) $(5w^8)^2$

h.) $-(4x^3)^4$

i.) $(x^2)^{-1}$

j.) $(x^4)^2 \cdot (x^{-1})^{-4}$

k.) $(p^4q^2)^7$

l.) $(x^3y^4)^3 \cdot (xy^3)^{-2}$

Baby Beast

http://stuffofaw esome.com/just-a-baby-panther-1322917203-5068.jpg.html