

# **Exponents & Scientific Notation**

# ***Review***

1)  $b^3 \bullet b^2$

2)  $g^7 \bullet g^9$

3)  $7^4 \bullet 7^5$

4)  $\left(\frac{7}{8}\right) \bullet \left(\frac{7}{8}\right)^4$

5)  $j \bullet j^2 \bullet j^3$

## **The Product of Powers Property:**

To multiply powers with the same base \_\_\_\_\_

\_\_\_\_\_.

***...with coefficients***

6)  $(7n^6)(3n^5)$

7)  $(-6x^2y^4)(4x^5y)$

***Let' see...***

8)  $(7^2)^3$

9)  $\left[\left(\frac{2}{3}\right)^2\right]^4$

10)  $(h^3)^4$

11)  $\left[(-5)^4\right]^6$

**The Power of Powers Property:**

To find a power of a power \_\_\_\_\_ .

***Let' see...***

12)  $(4d^5)^3$

13)  $(-2x^4y^2)^3$

14)  $(-5m^3)^2$

**The Power of Products Property:**

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## The Quotient of Powers Property:

\_\_\_\_\_ base & \_\_\_\_\_ the exponents.

$$15) \frac{n^{24}}{n^{16}}$$

$$16) \frac{1}{x^5} \bullet x^8$$

$$17) \frac{1}{(-7)^4} \bullet (-7)^{11}$$

$$18) \frac{x^3 y}{x^2}$$

## RULES:

- ANY number to the zero power equals \_\_\_\_\_.
- $a^{-n}$  is the \_\_\_\_\_ of  $a^n$ .

## Evaluate

19)  $5^{-2}$

20)  $75^0$

21)  $(-56)^0$

22)  $\left(\frac{2}{5}\right)^{-3}$

23)  $\frac{1}{3^{-4}}$

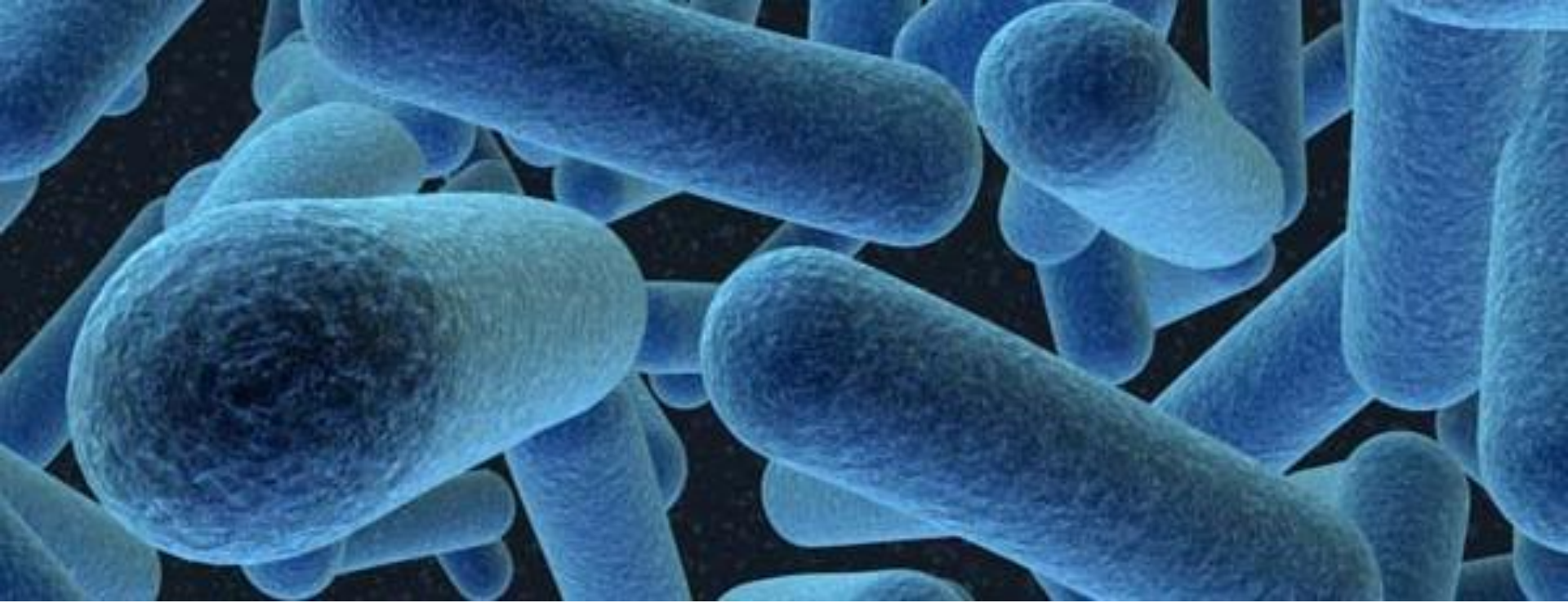
24)  $(-3)^{-3}$



**Distance from Earth to the Sun**

**150,000,000 km**





**Size of Bacterium**

**0.0000625 cm**

# Scientific Notation

A number is expressed in scientific notation when it is in the form

$$a \times 10^n$$

where **a** is between 1 and 10  
and **n** is an integer

# **Scientific Notation**

**This is way of writing very big or small numbers in an easier way.**

**150,000,000**

# Scientific Notation

This is way of writing very big or small numbers in an easier way.

0.0000625

# **Scientific Notation**

Write the following in scientific notation:

1) 64,830,000,000,000

2) 0.000000000089

3) 118,000,000,000,000

4) 0.00000000000000025

5) 67

# Standard Form

Write the following in standard form:

6)  $2.5 \times 10^3$

7)  $3.94 \times 10^{-4}$

8)  $6.47 \times 10^6$

9)  $7.83 \times 10^{-7}$

10)  $2.5 \times 10^2$

# Rules for Operations

**To make scientific notation have a bigger exponent:**

- Move the decimal left
- Add the number of times you moved the decimal to the exponent.

1)  $2.4 \times 10^3$

3)  $8.2 \times 10^{-9}$

2)  $7.1 \times 10^7$

4)  $4.6 \times 10^{-4}$

# **Fixing non-scientific notation**

1)  $35 \times 10^8$

2)  $215 \times 10^9$

3)  $4,587 \times 10^2$



# Fixing non-scientific notation

4)  $0.15 \times 10^7$

5)  $0.00057 \times 10^9$

6)  $.05782 \times 10^2$

**Find the sum or difference. Write your answer in scientific notation.**

**a.**  $(4.6 \times 10^3) + (8.72 \times 10^3)$

**b.**  $(3.5 \times 10^{-2}) - (6.6 \times 10^{-3})$

**Find the sum or difference. Write your answer in scientific notation.**

**c.**  $(2.1 \times 10^{-4}) + (9.74 \times 10^{-4})$

**d.**  $(4.7 \times 10^5) - (7.2 \times 10^3)$

**Find the sum or difference. Write your answer in scientific notation.**

**e.**  $(8.2 \times 10^2) + (3.41 \times 10^{-1})$

# Practice

$$1) \left(17 \times 10^{12}\right) + \left(255 \times 10^{12}\right)$$

$$2) \left(340 \times 10^{-6}\right) - \left(285 \times 10^{-6}\right)$$

# Practice

$$3) \left( 7.545 \times 10^8 \right) + \left( 4.55 \times 10^7 \right)$$

$$4) \left( 8.7 \times 10^7 \right) - \left( 5.5 \times 10^6 \right)$$

# ***Lesson***

**Find  $(3 \times 10^{-5}) \times (5 \times 10^{-2})$ . Write your answer in scientific notation.**

Find  $(2 \times 10^{-4}) \times (6 \times 10^{-3})$ . Write your answer in scientific notation.



# ***Lesson***

Find  $\frac{1.5 \times 10^{-8}}{6 \times 10^7}$ . Write your answer in scientific notation.

Find  $\frac{5.3 \times 10^8}{4 \times 10^{-3}}$ . Write your answer in scientific notation.