

Name: \_\_\_\_\_

Date: \_\_\_\_\_ Period: \_\_\_\_\_

### Scientific Notation

Scientific notation is often used in science to make working with very small or very large numbers easier. It is not practical to write out numbers like **0.00000000028** or **1,300,000,000** – scientific notation gives us another way to represent the same number.

A number given in scientific notation consists of three parts: the coefficient, the base, and the exponent.

Coefficients must be between **1.0 and 9.99999**, the base is always **x10**, and the exponent represents the number of places we have moved the decimal point in order to convert from standard form to scientific notation.

- **For numbers less than 1, the exponent will always be negative.**
- **For numbers greater than 1, the exponent will always be positive.**

#### Examples:

Example 1: If we convert **0.00000000028** to scientific notation, we must first get the coefficient within the accepted range. The coefficient here would be **2.8**. The base is always **x10**, so the only thing left is identifying the correct exponent. For numbers less than 1, the exponent will always be negative.

The exponent is equal to the number of decimal places we moved the decimal to get to our coefficient. For this example the exponent would be **-10**. The final answer would be written as **2.8 x10<sup>-10</sup>**

Example 2: Converting **1,300,000,000** to scientific notation will use the same rules; the only difference is the exponent will be positive since the original number is greater than 1. The coefficient would be **1.3**, base **x10** and the exponent would be **9**. The final answer would be **1.3 x10<sup>9</sup>**.

*Convert the following numbers into scientific notation:*

1) 3,400 \_\_\_\_\_

2) 0.000023 \_\_\_\_\_

3) 101,000 \_\_\_\_\_

4) 0.010 \_\_\_\_\_

5) 45.01 \_\_\_\_\_

*Convert the following numbers into standard notation:*

6)  $2.30 \times 10^4$  \_\_\_\_\_

7)  $1.76 \times 10^{-3}$  \_\_\_\_\_

8)  $1.901 \times 10^{-7}$  \_\_\_\_\_

9)  $8.65 \times 10^{-1}$  \_\_\_\_\_

10)  $9.11 \times 10^3$  \_\_\_\_\_

Convert the following numbers into scientific notation: Make sure to have the correct number of significant figures

1) 923 \_\_\_\_\_

2) 0.00425 \_\_\_\_\_

3) 4523000 \_\_\_\_\_

4) 0.94300 \_\_\_\_\_

5) 6750. \_\_\_\_\_

6) 92.03 \_\_\_\_\_

7) 7.80 \_\_\_\_\_

8) 0.00000032 \_\_\_\_\_

9) 0.000780 \_\_\_\_\_

10) 0.00020 \_\_\_\_\_

Convert the following numbers into standard notation: Use sig figs!

11)  $3.92400 \times 10^5$  \_\_\_\_\_

12)  $9.2 \times 10^6$  \_\_\_\_\_

13)  $4.391 \times 10^{-3}$  \_\_\_\_\_

14)  $6.825 \times 10^{-4}$  \_\_\_\_\_

15)  $4.6978 \times 10^4$  \_\_\_\_\_

16)  $8.36 \times 10^1$  \_\_\_\_\_

17)  $2.46 \times 10^{-5}$  \_\_\_\_\_

18)  $8.8 \times 10^2$  \_\_\_\_\_

19)  $2.46 \times 10^{-2}$  \_\_\_\_\_

20)  $8.8 \times 10^6$  \_\_\_\_\_