

**University of Guelph  
Numeracy Project**

# **About Scientific Notation: Examples**



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## About Scientific Notation: Examples

### Conversion between Numbers and Scientific Notations

#### *Conversion of a number into scientific notation*

- ▶ Convert 15,789,000 into scientific notation.

15,789,000 -- shift the decimal point to the *left* by **7 place holders** to acquire a number between 1 and 10.

$$= 1.5789 \times 10^7 \quad n = 7$$

- ▶ Convert 0.0000017256 into scientific notation.

0.0000017256 -- shift the decimal point to the *right* by **6 place holders** to acquire a number between 1 and 10.

$$= 1.7256 \times 10^{-6} \quad n = -6$$

#### *Conversion of scientific notation into a number*

- ▶ Convert  $9.2562 \times 10^6$  into its decimal form.

$9.2562 \times 10^6$  -- since  $n = 6$ , shift the decimal point to the *right* by **6 place holders**.

$$= 9,256,200$$

- ▶ Convert  $2.3737623 \times 10^{-5}$  into its decimal form.

$2.3737623 \times 10^{-5}$  -- since  $n = -5$ , shift the decimal point to the *left* by **4 place holders**.

$$= 0.000023737623$$

## Algebraic Operations Involving Scientific Notation

### ***Addition and Subtraction***

- ▶ Evaluate  $(1.726 \times 10^4) - (3.726 \times 10^{-4})$ , and express the answer in scientific notation.

$$(1.726 \times 10^4) - (3.726 \times 10^{-4}) \text{ -- convert } 1.726 \times 10^4 \text{ so that its power of } 10 \text{ is } 10^{-4} \text{ (alternatively, you can convert } 3.726 \times 10^{-4} \text{ so that its power of } 10 \text{ is } 10^4)$$

$$= (172600000 \times 10^{-4}) - (3.726 \times 10^{-4}) \text{ -- subtract the mantissa}$$

$$= 172599996.274 \times 10^{-4} \text{ -- convert into the conventional form of scientific notation}$$

$$= 1.726 \times 10^4$$

- ▶ Evaluate  $(3.73 \times 10^3) / (6.26 \times 10^8)$ , and express the answer in scientific notation.

$$(3.73 \times 10^3) / (6.26 \times 10^8) \text{ -- divide the two powers of } 10 \text{ by subtracting their exponential values}$$

$$= (3.73 / 6.26) \times 10^{-5} \text{ -- divide the two mantissas}$$

$$= 0.5958 \times 10^{-5} \text{ -- convert into conventional form of scientific notation}$$

$$= 5.958 \times 10^{-6}$$

## Scientific Notation and Calculators

- ▶ Consider the following example:

Suppose we want to enter  $8.256 \times 10^3$  into a calculator.

First, enter 8.256 (the mantissa of the scientific notation) into the calculator.

Your display may look like this: 8.256

Second, press the **EE** or **EXP** key to activate the exponent field.

Your display may look like this: 8.256<sup>00</sup>

**\*\*Note:** The two zeroes indicate the value of the exponent**\*\***

Now, enter 3 (the value of the exponent) into the calculator.

Your display may look like this: 8.256<sup>03</sup>

**Note:** By using either the **EE** or **EXP** key, you do not have to press the “x” key to indicate multiplication, or even enter 10. The calculator recognizes that you are entering the numbers in the form of scientific notation.

- ▶ Consider the following example:

Suppose we want to enter  $0.1356 \times 10^{-1}$  into a calculator.

First, enter 0.1356 (the mantissa of the scientific notation) into the calculator.

Your display may look like this: 0.1356

Second, press the **EE** or **EXP** key to activate the exponent field.

Your display may look like this: 0.1356<sup>00</sup>

**\*\*Note: The two zeroes indicate the value of the exponent\*\***

Now, enter -1 (the value of the exponent) into the calculator.

Your display may look like this: 0.1356<sup>-1</sup>

Notice that the negative sign is on the exponent, not the mantissa. The value of the number is still positive, but it is between 0 and 1.

However, if the number itself (i.e., the mantissa) is negative, you have to negate the number before you press the **EE** or **EXP** key.