5-4 Scientific Notation

Scientific notation - a way to easily write very large or very small numbers
- **1st number is always a decimal in between 1 and 10**
- **2nd number is a 10 to a power**

Ex. 3.8×10^3

Standard notation - The way we normally see a number

Key Questions

Is 12.34×10^2 in scientific notation?

No.

Is 0.237×10^3 in scientific notation?

No.

Is 3.18×3^{10} in scientific notation?

No.

From Scientific to standard notation:

1.) Find the exponent of 10.
2.) Move the decimal to the right that many times if the number is
   positive.
   If the exponent is negative, move the decimal that many places
   to the left.

Positive exponent: Big #

Negative exponent: Small #

Write using standard notation.

1.76×10^{①}

1.76

$\boxed{17.6}$

1.76×10^{②}

1.76

$\boxed{176}$

3.9×10^{-③}

003.9 $\boxed{0.0039}$

From standard to scientific:

1.) Move the decimal between the 1st two numbers
2.) Count how many places you moved the decimal.
    - Move left: positive exponent of 10
    - Move right: negative exponent of 10
3.) Multiply steps 1 and 2

Write using scientific notation:

32,100,000. 3.21×10^{7}

0.003867 3.867×10^{-3}

0.134 1.34×10^{-1}

72,560. 7.256×10^{4}

Multiply or divide. Express the result using scientific notation.

$$(5.2 \times 10^9)(3.0 \times 10^{-3})$$

$$(5.2 \times 3.0)(10^9 \times 10^{-3})$$

$$15.6 \times 10^{6+1}$$

$$1.56 \times 10^7$$

$$(8.1 \times 10^4)(6.4 \times 10^6)$$

$$(8.1 \times 6.4)(10^4 \times 10^6)$$

$$51.84 \times 10^{10+1}$$

$$5.184 \times 10^{11}$$

$$\frac{2.7 \times 10^{16}}{9 \times 10^{-8}}$$

Left: Add

Right: Subtract

$$\frac{4.8 \times 10^6}{6.0 \times 10^8}$$

$$\frac{2.7}{9} \times \frac{10^{16}}{10^{-8}}$$

$$0.8 \times 10^{-2-1}$$

$$8.0 \times 10^{-3}$$

$$0.3 \times 10^{16-(-8)}$$

$$0.3 \times 10^{24-1}$$

$$3.0 \times 10^{23}$$