Converting Scientific Notation

Lesson Objectives

1 Determine if a number is correctly written using scientific notation

2 Convert large numbers in decimal notation to scientific notation. Write large numbers using scientific notation.

3 Convert small numbers in decimal notation to scientific notation. Write small numbers using scientific notation.

SCIENTIFIC NOTATION

A number is written in <mark>scientific notation if</mark> it is of the form

$$c \times 10^{n}$$

where $1 \leq c < 10$ and n is an integer.*

*

Sort the given values.

Written in proper scientific notation

$$6.09 \times 10^7$$
$$3.214 \times 10^1$$
$$5 \times 10^{-9}$$
$$2.1203 \times 10^{-16}$$
$$1.9 \times 10^{-22}$$
$$2.35 \times 10^5$$

$$10.3 \times 10^9$$
$$12 \times 10^0$$
$$-4.89 \times 10^8$$
$$-78.3 \times 10^{23}$$

$$45.9 \times 10^{-6}$$

NOT written in proper scientific notation

Scientific notation is used to write really big numbers.

decimal notation   *scientific notation*

123,000,000,000 1.23×10^{11}

45,000,000 4.5×10^{7}

67,800,000,000,000 6.78×10^{13}

9,000 9×10^{3}

move the star to count the number of decimal places

the amount of moves will give you the exponent value

Scientific notation is used to write really big numbers.

scientific notation   *decimal notation*

7.82×10^{-3} .00782

3.04×10^{8} 304,000,000

5×10^{4} 50,000

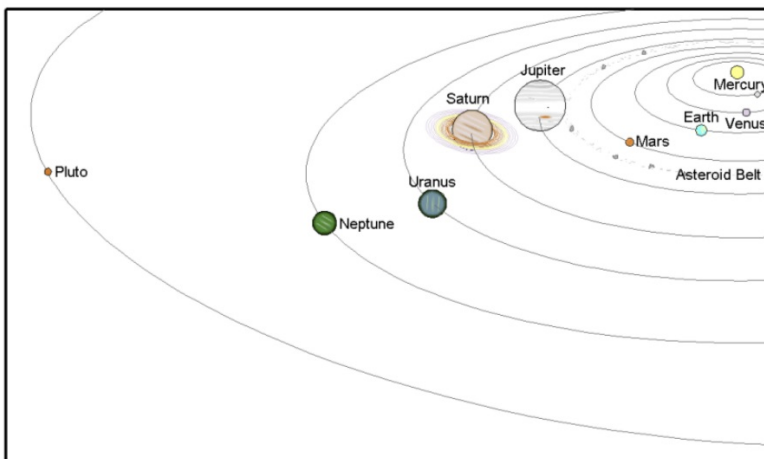6.2103×10^{-10} .00000000062103

the exp
how m
places

*Negative Exponent...Move decimal to the left.
*Positive exponent...Move decimal to the right.

An example of a really big number. Please write it in scientific notation

As the planets orbit the sun, the closest Pluto gets to Earth is approximately 2,700,000,000 miles.

2.7×10^9

The speed of light in a vacuum is approximately 186,000 miles per second.

186,000 1.86×10^5

Scientific notation is used to write really small numbers.

decimal notation   *scientific notation*

0.000000034 3.4×10^{-8}

0.0000000005609 5.609×10^{-10}

0.000000000064 6.4×10^{-11}

0.007 7×10^{-3}

move the star to count the number of decimal places

the amount of moves will give you the exponent value

Scientific notation is used to write really small numbers.

scientific notation   *decimal notation*

4.8×10^{-6} .0000048

1.2×10^{-12} .0000000000012

9×10^{-2} .09   **With negative exponents, you will have a really small number when you convert to standard form.**

7.1034×10^{-5} .000071034

the exponent tells you how many decimal places you need to move

Human fingernails grow at a rate of about 0.00286 inches per day.

.00286 2.86×10^{-3}

The thickness of a red blood cell is approximately 0.0003125 of an inch.

.0003125

3.125×10^{-4}

Red blood cell

Platelets

0.5 mm

White blood cell