

Sec 8-2: Scientific Notation

Scientific Notation:

A number greater than or equal to 1 but less than 10
times
a power of 10.

It's a compact way to write really big or really small numbers

Examples of numbers written in Scientific Notation.

$$5.209 \times 10^7$$

$$8.33 \times 10^{-4}$$

Scientific Notation

Standard Notation
or
Decimal Notation

$$25,000 = 2.5 \times 10^4$$

Is each number written in scientific notation?

1. 63.91×10^5

↑
Too Big

No

2. 1.0031×10^{-3}

Yes

3. 0.98974×10^{-6}

↑
Too small

No

Does each scientific notation number represent a "big" number or a "small" number?

1. 7.908×10^{-5}
SMALL

2. 3.74×10^2 BIG

3. 2.0027×10^8
BIG

4. 9.998×10^{-3} SMALL

When in Scientific Notation:

A negative exponent means a SMALL number

A positive exponent means a BIG number

Write each number in Scientific Notation:

1. 82,500,000.

8.25×10^7

exponent should be positive
because the original number
is "big"

2. 0.000056

5.6×10^{-5}

exponent should be negative
because the original number
is "small"

Write each number in Standard Notation
(also known as Decimal Notation)

1. 4.33 $\times 10^{-4}$

0.000433

2. 5.0734 $\times 10^7$

50,734,000

Each number is NOT in Scientific Notation. Rewrite it so that it IS in Scientific Notation.

1. 223×10^5

Method 1:

First change number to Standard Notation:

22,300,000

Then change it into Scientific Notation correctly:

2.23×10^7

2. 4561×10^{-8}

Method 2:

First decide where the decimal point should be:

4.561

Since this moves the decimal point three times you need to change the exponent by an equal amount. To decide if you increase or decrease the exponent by three think about it this way: Since you made 4561 **smaller** to turn it into 4.561 you must make the exponent **bigger** by 3 to keep the overall number the same.

$4.561 \times 10^{-8+3} =$

4.561×10^{-5}

3. 0.00819×10^{-3} 3 smaller
 8.19×10^{-6} 3 bigger

4. 0.0755×10^4 2 smaller
 7.55×10^2 2 bigger

light travels 186,000 miles per second. How far does light travel in:

1 day?

$186,000 \frac{\text{mi}}{\text{Sec}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{24 \text{ hr}}{1 \text{ day}}$

$= 1.60704 \text{ E } 10$

This is the calculator's way of writing Scientific notation.

$1.60704 \text{ E } 10$ means 1.60704×10^{10}

Entering a number in Scientific Notation on the calculator

1.87×10^6

1. Enter the decimal portion: 1.87
2. Press **2ND** then **,**
3. Enter the exponent: 6

You will see $1.87 \text{ E } 6$
 which is calculator's way of writing 1.87×10^6

You can now finish Hwk #9

pages 402-403

Due Monday

Problems 1-3, 10-12, 16-18, 42, 43