

## Lesson 1.8 – Scientific Notation

**Recall that** we can use powers of ten to describe place values. We also can use powers of ten to write standard numbers in an expanded form. Rewrite the numbers below in expanded form by using powers of ten.

567,213
0.062954
45,980.57
789.3082

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### Scientific Notation

$$8.35 \times 10^{12}$$

A number expressed in scientific notation.



Go to [http://en.wikipedia.org/wiki/Scientific\\_notation](http://en.wikipedia.org/wiki/Scientific_notation) . Read the introduction and the section titled “Normalized Notation”, then go onto the activities on the next page.

Using the expression  $a \times 10^b$ , where  $a$  is any real number and  $b$  is an integer, complete the following:

**Activity 1** - Circle all values that could be used for  $a$  in normalized scientific notation.

6.28	314	-10.4	7.32	13
-4.98	5.12	44	-235	7.99
90	-3.00	897	5	102

**Activity 2** - Circle all values that can be used for  $b$  in normalized scientific notation.

6.2	3	10	-7.32	-1
4	-5	4.2	2.35	17
9	3.4	8	5.09	102

**Activity 3** - Circle all the expressions that are expressed in normalized scientific notation.

$6.28 \times 10^5$	$314 \times 10^{-2}$	$-10.4 \times 10^8$	$7.32 \times 10^{2.5}$	$13 \times 10^{-0.8}$
$-4.98 \times 10^3$	$5.12 \times 10^{0.09}$	$44 \times 10^7$	$-235 \times 10^{-6}$	$7.99 \times 10^{15}$
$90 \times 10^{-2}$	$-3.00 \times 10^{8.25}$	$897 \times 10^1$	$5 \times 10^{-5}$	$102 \times 10^2$

**Class Notes** – Write each expression in decimal form.

LP#1 $7.00 \times 10^4 =$	$5.00 \times 10^6 =$	$8 \times 10^2 =$
LP#2 $7.21 \times 10^4 =$	$5.89 \times 10^6 =$	$8.1 \times 10^2 =$
LP#3 $7.00 \times 10^{-4} =$	$5.00 \times 10^{-6} =$	$8 \times 10^{-2} =$
LP#4 $7.21 \times 10^{-4} =$	$5.89 \times 10^{-6} =$	$8.1 \times 10^{-2} =$

Explain the pattern that you see above in relation to exponents being positive.

Explain the pattern that you see above in relation to exponents being negative.

**Class Notes** – Express each number using scientific notation.

LP#5 534,000	6,500	985,000,000
LP#6 0.00083	0.0000000121	0.00005732
LP#7 9,310,000,000	0.000000398	443

Extra Problems

- 1) Earth is approximately 93 million miles away from the sun. Express this distance in scientific notation.
- 2) Jupiter is approximately  $4.83 \times 10^8$  miles away from the sun. Express this distance in standard form.

**Review** – In the **left column** write each expression in decimal form. In the **right column** express each decimal using scientific notation.

R#1 $6.90 \times 10^3 =$  $4.68 \times 10^{-5} =$	8,350  0.0432
R#2 $7.01 \times 10^4 =$  $2.56 \times 10^{-9} =$	9,210,000  0.000054
R#3 $9.23 \times 10^5 =$  $2.71 \times 10^{-7} =$	360,000  0.000781