

Name: Key

Class: _____

M8-U6: Notes #4 – Scientific Notation

Date: _____

Definition: A number in scientific notation is written as a product of two factors in the form of $a \times 10^n$, where n is an integer and $1 \leq |a| < 10$.

What does that mean in words?

What is the purpose of using scientific notation?

Allows us to write very large or very small numbers more efficiently

Recognizing Scientific Notation

Is each number written in scientific notation? If not, give a reason why it is not.

1. 0.46×10^4 No .46 < 1

2. 3.25×10^{-2} yes _____

3. 13×10^5 No 13 > 10

4. $8.325 \cdot 10^{-12}$ yes _____

5. $-403 \cdot 10^2$ No -403 < 1

Understanding Powers of 10 (Numbers 10 or more):

Standard Form	Product of Factors	Scientific Notation
40	4×10	4×10^1
500	5×100 5×10^2	5×10^2
8000	8×1000 8×10^3	8×10^3
9600	96×100 $9.6 \times 10 \times 100$ $9.6 \times 10^1 \times 10^2$	9.6×10^3
12	1.2×10^1	1.2×10^1

Summary:

The coefficient is greater than 1 and less than 10.

For numbers greater than or equal to 10, use a positive exponent.

Understanding Powers of 10 (Numbers Less Than 1):

Standard Form	Product of Factors	Scientific Notation
0.2	$2 \times \frac{1}{10}$ 2×10^{-1}	2×10^{-1}
0.04	$4 \times \frac{1}{100}$ $4 \times \frac{1}{10^2}$	4×10^{-2}
0.005	$5 \times \frac{1}{1000}$ $5 \times \frac{1}{10^3}$	5×10^{-3}

Summary:

The coefficient is greater than 1 and less than 10.

For numbers less than 1, use a negative exponent.

Writing a Number in Scientific Notation:

1. 127,000,000 1.27×10^8
 $1.27 \times 10^2 \times 10^6$

2. 0.0000000024 2.4×10^{-9}

3. 7200 7.2×10^3
 72×10^2
 $7.2 \times 10 \times 10^2$

4. 0.000389 3.89×10^{-4}

Try It! – Write each number in scientific notation.

a) 427.7 4.277×10^2

b) 856.2 8.562×10^2

c) 0.0007 7×10^{-4}

d) 0.00643 6.43×10^{-3}

Writing a Number in Standard Form:

1. 8.4×10^5 840,000

2. 7.32×10^{-3} .00732

3. 2.431×10^4 24,310

4. 5.27×10^{-2} .0527

Summary of Scientific Notation:

Positive exponents make the decimal move to the right.

Negative exponents make the decimal move to the left.

Try It! – Write each number in standard form.

a) 9×10^4 90,000

b) 2.5×10^{-2} 0.025

c) 8.12×10^{-5} .0000812

d) 7.1×10^3 7,100

