Lesson 3-2
Scientific Notation

Complete the table.

Exponents	10^1	10^2	10^3	10^4
Factors	$10 \cdot 1$	$10 \cdot 10$	$10 \cdot 10 \cdot 10$	$10 \cdot 10 \cdot 10 \cdot 10$
Product	10	100	1,000	10,000
Number of Zeros in Product	1	2	3	4

What patterns do you notice?

- Add a zero each time.
- # of zero is the same as the exponent

Find the answer for 10^5 without calculating? 100,000

Find the missing exponent. $10^{\square} = 100{,}000{,}000$

We can use what we know about powers of 10 to help us write REALLY large numbers in an easier way. It is called SCIENTIFIC NOTATION.

Scientific Notation	A number written as the product of two factors, 1 greater than or equal to 1, but less than 10, and the other a power of 10.	

$$7{,}500{,}000{,}000 = 7.5 \times 10^{12}$$

7.5: ≥ 1 *and* < 10

10^{12}: *Power of* 10

How do I write a number in Scientific Notation?

3,400,000

Step 1: Add the decimal (if there isn't one already). **3,400,000.**

Step 2: Jump the decimal to the left until you have a number ≥ 1 *and* < 10.

Don't forget to count your jumps! **3400000.**

6 5 4 3 2 1

Step 3: Rewrite the number you created (without the zeros) **3.4**

Step 4: Multiply by the power of 10 (the exponent is the number of jumps). 3.4×10^{6}

You Try!

2,000,000, 2.0×10^{6}

3,500, 3.5×10^{3}

489,000, 4.89×10^{5}

17,000,000,000, 1.7×10^{10}

Are these numbers written in Scientific Notation?

3.2×10^2

~~2×10^7~~ YES or NO

11×10^8 YES or (NO)

300×10^5 YES or (NO)

0.5×10^{12} YES or (NO)

1.85×10^{10} (YES) or NO

Changing Scientific Notation → Standard Form

$$2.8 \times 10^5$$

METHOD 1:

Step 1: Look at the exponent and jump the decimal to the right that many spaces.

Step 2: Add zeros. 2.8 00000

Step 3: Add commas (start at the right and add a comma after every third number). 280,000

You Try!

4.7×10^9

4.7 0 0 0 0 0 0 0 0 0

4,700,000,000

~~15×10^{11}~~

3.15×10^{11}