

Algebra I
Lesson 7.2 – Powers of 10 and Scientific Notation
Mrs. Snow, Instructor

If we were to want to write the weight of an atomic particle or the distance to a far off galaxy, we would be writing some extremely small or large numbers. Scientists have a way to deal with this dilemma it is called **scientific notation**. For example instead of writing a decimal number 0.000000000023. we can write in scientific notation and have: 2.3×10^{-11} . Really? Well that is a multiplication sign between the two numbers and we need to think of 2.3×10^{-11} as a product of two numbers: 2.3 , the digit term and 10^{-11} as an exponential term. Doing our multiplication.... we would eventually get our teeny tiny decimal number.

Vocabulary

Scientific Notation – standard format for expressing very large and very small numbers. A number is written in 2 parts. First part is a number greater than or equal to 1 and less than 10. The second part is a power of 10:

$$2.3 \times 10^5 = 2.3 \times 100000 = 230000$$

Standard Form - The usual way that a number is written (not scientific form)

Complete the table below:

| | | | | | | | |
|--------------|--------|--------|--------|--------|-----------|-----------|-----------|
| Power | 10^3 | 10^2 | 10^1 | 10^0 | 10^{-1} | 10^{-2} | 10^{-3} |
| Value | 1000 | | 10 | 1 | | | |

Notice how we are dividing by 10 between each number. AND THE BASE IS ALWAYS 10

| | |
|---|---|
| <p>To write in powers of 10:</p> <p>$10^{-3} = .001$ ←</p> <p>$10^4 = 10000$ →</p> <p>$10,000,000 = 10^7$ ←</p> <p>$0.000001 = 10^{-6}$ →</p> | <p>Start with the number 1 and move the decimal point.</p> <p>← When a negative exponent move to the left exponent number of times.</p> <p>When a positive exponent move to the right exponent number of times. →</p> <p>When the number is greater than 0, count the number of places to get to the 1, this is your exponent value.</p> <p>The decimal is exponent places to the left of 1 so the exponent is negative</p> |
|---|---|

Find the value of each expression.

| | | |
|------------------------|--|---------------------|
| 10^6 | 10^{-5} | 853.4×10^5 |
| 0.163×10^{-2} | Write each number as a power of 10: 100,000,000,000 | .0000000000001 |

Jupiter's diameter is about 143,000 km. Write this in scientific notation.

Jupiter's orbital speed is approximately $1.3 \times 10^4 \frac{m}{s}$
write in standard form.

Are these numbers in scientific notation? Correct if necessary

8.1×10^{-2}

7×10^8

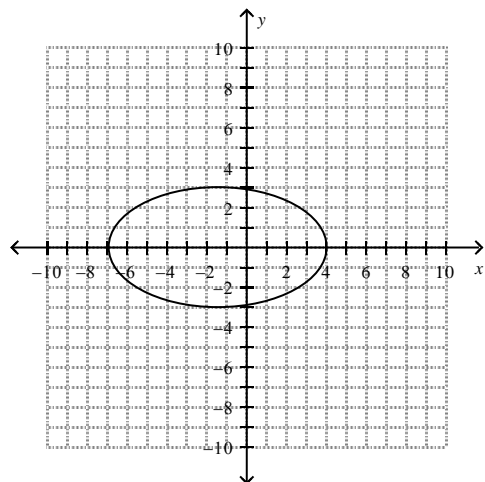
50×10^{-3}

.01

0.25×10^3

3.5×10^{-6}

Identify the domain and range:



Identify the domain and range:

