Comparing Numbers in Scientific Notation

Objective: I can compare numbers written in scientific notation.

Warm Up: Are the following numbers written in scientific notation? If not, state the reason.

(a) $4.0701 + 10^7$

No! Scientific Notation uses multiplication!

(b) $.325 \times 10^{-2}$

No! The first factor must be a single Non-Zero digit!

Investigation 1: Express each scientific notation in standard form-

(a) 4.3×10^2

$4.3_{0} = 430$

(b) 2.5×10^3

$2.5_{00} = 2{,}500$

Which number is smaller?

4.3×10^2

Which number is larger?

2.5×10^3

The largest exponent is the greatest value.

Investigation 2: Express each scientific notation in standard form-

(a) 2.1×10^4

$21_{000} = 21{,}000$

(b) 1.5×10^4

$15_{000} = 15{,}000$

Which number is smaller?

1.5×10^4

Which number is larger?

2.1×10^4

Is there a relationship between the value of the coefficient and which number is larger or smaller?

When the exponents are the same, the larger coefficient has the greatest value.

Guided Practice: *Steps for Comparing Numbers in Scientific Notation Form*

1. To compare two numbers given in scientific notation, first compare the exponent.

   The one with the greater exponent will be larger.

2. If the exponents are the same, then compare the decimals.

Compare the quantities in the following exercises using <, >, or =.

Exercise 1: 1.06×10^{16} ___>___ 2.4×10^{15}

Exercise 2: 2.78×10^{7} ___<___ 278×10^{7}

LA

2.78×10^{9}

larger exp.

Exercise 3- Order the countries shown in the accompanying table according to the amount of money their visitors spent in the United States from *least* to *greatest.*

Least → ① India

② Mexico

③ Canada

Greatest → ④ United Kingdom

Dollars Spent by International Visitors in the U.S	
Country	Dollars Spent
Canada	1.03×10^{7}
India	1.83×10^{6}
Mexico	7.15×10^{6}
United Kingdom	1.06×10^{7}

Problem Set:

*First, they all must be in Sci. Not.

For the following problems, use >, <, *or* = to make the statement true.

(1) 9.74×10^{21} ___<___ 2.1×10^{22}

(2) 5.28×10^{12} ___<___ 95.4×10^{12}

LA

9.54×10^{13}

(3) 2.33×10^{10} ___<___ 7.6×10^{10}

(4) 4.4×10^{7} ___=___ 44,000,000

4.4×10^{7}

(5) 548,000,000 ___>___ 5.48×10^{7}

5.48×10^{8}

(6) 1.2×10^{-3} ___<___ 4.7×10^{-3}

(7) 6.23×10^{14} ___>___ 8.912×10^{12}

(8) 5.15×10^{-4} ___>___ 6.35×10^{-5}

$-4 > -5$

(9) 3.28×10^{17} ___<___ 4.25×10^{17}

(10) -1.2×10^{5} ___>___ -1.7×10^{5}

$-1.2 > -1.7$ because its closer to 0.

(11) Compare the following problem. *Be sure to explain your reasoning.*

Not correct scientific notation!

LA

12.8×10^{3} ___>___ 1.4×10^{3}

1.28×10^{4}

When in scientific notation, exponents $4 > 3$.