

10.6

Writing Numbers in Scientific Notation

Learning Targets

- Write Numbers in Scientific Notation
- Compare Numbers
- Use Scientific Notation

$$7.52 \times 10^8$$

Remember from our 10.5 Lesson and Notes

Positive and Negative Exponents

7.6×10^{12} (x 1,000,000,000,000) Really Big Numbers

3.2×10^{-8} Really Small Numbers
(x 0.00000001)

Standard Form to Scientific Notation

384,000

leading,
non-zero
digit

original decimal
location

384,000

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step 1: 384,000

Identify the Leading
Non-Zero Digit

step 2: Move the decimal point to the right
of the leading nonzero digit

step 3: 5

Count the number of places you moved the point.
This is the exponent of the power of 10

3.84×10^5



Standard Form to Scientific Notation

0.00000000421

original decimal
location

leading,
non-zero
digit

$$4.21 \times 10^{-9}$$

0.00000000421

step 1: Leading digit

step 2: New decimal location

step 3: Count # of places moved

4.21 x 10⁻⁹

Writing Large Numbers in Scientific Notation



Google purchased YouTube for \$1,650,000,000.
Write this number in scientific notation.



$$1.65 \times 10^9$$

Writing Small Numbers in Scientific Notation

The 2004 Indonesian earthquake slowed the rotation of Earth, making the length of a day 0.00000268 second shorter. Write this number in scientific notation.

$$2.68 \times 10^{-6}$$



An album receives an award when it sells 10,000,000 copies.

An album has sold 8,780,000 copies. How many more copies does it need to sell to receive the award?

$$\begin{aligned}\text{Remaining sales} &= \text{Sales required} - \text{Current sales} \\ \text{needed for award} &= \text{for award} - \text{total} \\ &= 10,000,000 - 8,780,000 \\ &= 1,220,000 \\ &= 1.22 \times 10^6\end{aligned}$$

Let's compare numbers that are written in Scientific Notation.

$$6.7 \times 10^1$$
$$6.7 \times 10^2$$
$$6.7 \times 10^3$$
$$6.7 \times 10^4$$
$$6.7 \times 10^8$$

$$8.21^{-1}$$
$$8.21^{-2}$$
$$8.21^{-3}$$
$$8.21^{-4}$$
$$8.21^{-10}$$

$$8.21 \times 10^{-1}$$

$$8.21 \times 10^{-10}$$

Using Numbers in Scientific Notation



The table shows when the last three geologic eras began. Order the eras from earliest to most recent.

Earliest
Most Recent

Era	Began
Paleozoic	5.42×10^8 years ago
Cenozoic	6.55×10^7 years ago
Mesozoic	2.51×10^8 years ago

Middle

Because $10^7 < 10^8$,
 $6.55 \times 10^7 < 5.42 \times 10^8$ and
 $6.55 \times 10^7 < 2.51 \times 10^8$.

Because $2.51 < 5.42$,
 $2.51 \times 10^8 < 5.42 \times 10^8$.

From greatest to least, the order is 5.42×10^8 , 2.51×10^8 , and 6.55×10^7 .



Order from Least to Greatest

$$\frac{5}{241}, 0.02, 2.1 \times 10^{-2}$$

$$0.0207468 \quad 0.020 \quad 0.021$$

$$0.02, \frac{5}{241}, 2.1 \times 10^{-2}$$

10.6 Homework

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