6-1 Scientific Notation

CONTENT STANDARDS
8.EE.3

What You'll Learn

To write numbers in both standard form and scientific notation

New Vocabulary scientific notation

Please get a clicker and get ready for the warm up questions. There are a total of 6 clicker questions today.

Open Evernote - make a new note called Scientific Notation, and today's date.
Tag: scientific notation.

True or False. When you compute area of a parallelogram that has a height of 8 and a base of 3, the area will be 24 units

A True

B False

Text in one hundred four and three hundredths

Text in your answer using your number keypad.

Scientific Notation

Why Learn This?

When you are dealing with very large or very small numbers in science, it is helpful to be able to write them in a shorter form.

Written in standard form, or standard notation, the volume of Earth is about 259,000,000,000 cubic miles. Using scientific notation, you can write the number as 2.59×10^{11}.

Scientific Notation		Standard Form
2.59×10^{11}	=	259,000,000,000

KEY CONCEPTS Scientific Notation

A number is in **scientific notation** if the first factor is greater than or equal to 1 and less than 10 and the second factor is a power of 10.

Examples 1×10^8 1.54×10^7 9.99×10^4

Type this sentence into your notes:

Multiplying a number by 10^n, when n is positive, moves the decimal point n places to the right.

EXAMPLE 1 Writing in Standard Form

Science The temperature at the sun's core is about 1.55×10^7 degrees Celsius. Write the temperature in standard form.

$$1.55 \times 10^7 = 1.5500000. \leftarrow \text{Move the decimal point 7 places to the right. Insert zeros as necessary.}$$
$$= 15{,}500{,}000$$

The temperature at the sun's core is 15,500,000°C.

Example

1 Writing in Standard Form At one point, the distance from the Earth to the moon is 1.513431×10^{10} in. Write this number in standard form.

$1.513431 \times 10^{10} = 1.5134310000.$ ← ☐ **places to the right.**

Move the decimal point

Insert zeros as necessary.

$=$ ☐

At one point, the distance from the Earth to the moon is ☐ in.

Write 7.66 x 10^6 km^2, the area of Australia, in standard form

When you text in your answer, it is not necessary to type the commas.

Type this sentence into your notes:

To write a number in scientific notation, determine the first factor. Then write the second factor as a power of 10.

EXAMPLE 2 Writing in Scientific Notation

A supercomputer can perform 135,300,000,000,000 operations per second. Write this quantity in scientific notation.

$135{,}300{,}000{,}000{,}000 = 1.35{,}300{,}000{,}000{,}000.$ ← Move the decimal point 14 places to the left.

$= 1.353 \times 10^{14}$ ← Use 14 as the exponent of 10.

The supercomputer can perform 1.353×10^{14} operations per second.

Examples

2 Writing in Scientific Notation The diameter of the planet Jupiter is about 142,800 km. Write this number in scientific notation.

$142{,}800 = 1.42{,}800.$ ← Move the decimal point ☐ places to the left.

$= \square \times 10^{\square}$ ← Use ☐ as the exponent of 10.

The diameter of the planet Jupiter is about ☐ km.

The approximate diameter of the moon is 3,476,000 m. Write this in scientific notation

A $3476 \times 10^2 m$

B $34.76 \times 10^5 m$

C $3.764 \times 10^6 m$

D $3.476 \times 10^6 m$

Type this in your notes:

Negative exponents mean the answer will be a decimal number smaller than 1. It DOES NOT mean a negative number.

EXAMPLE **Scientific Notation With Negative Exponents**

3 **Biology** Fingernails grow about 1.23×10^{-2} centimeter per day. Write this rate in standard form.

$1.23 \times 10^{-2} = 01.23$ ← **Move the decimal point 2 places to the left to make 1.23 less than 1.**

Fingernails grow about 0.0123 centimeter per day.

3 Scientific Notation With Negative Exponents A typical width of a human hair is about 8.0×10^{-5} m. Write this number in standard form.

$8.0 \times 10^{-5} = 0.00008.0$ ← Move the decimal point ☐ places to the ☐ to make 8 less than 1.

A typical width of a human hair is ☐ meters wide.

EXAMPLE Numbers Less Than 1

4 Write the quantity 0.0000076 in scientific notation.

$0.0000076 = 0.000007.6$ ← Move the decimal point 6 places to the right to get a factor greater than 1 but less than 10.

$= 7.6 \times 10^{-6}$ ← Use −6 as the exponent of 10.

4 Numbers Less Than 1 Write the quantity 0.000089 in scientific notation.

$0.000089 = 0.00008.9$ ← Move the decimal point ☐ places to the ☐.

$= \square \times 10^{\square}$ ← Use ☐ as the exponent of 10.

A number is in scientific notation if the first factor is greater than or equal to ____ and less than 10. Text in the number that correctly fills in the blank

Use your keypad and text in your answer

Write 7.304×10^{-2} in standard form

Use your keypad and text in your answer.

Power down your clickers and put them back in the bag. Sync your Evernote notes.

You have 2 assignments on TenMarks called in Scientific Notation. You may use your notes on this computer assignment. Both of these tenmarks assignments need to be completed by the end of Wednesday. If you do not get them done today use save and finish later.