

Algebra I

Lesson 8-3

- I can express numbers in scientific notation and standard notation.
- I can find products and quotients of numbers expressed in scientific notation.

A number is expressed in Scientific notation when it is written as a product of a factor and a power of 10. The factor must be greater than or equal to one and less than ten.

A number in Scientific notation is written as $a \times 10^n$, where $1 \leq a < 10$ and n is an integer.

$$6.59 \times 10^4 =$$

$$6.59 \times 10,000$$

$$65,900$$

$$4.81 \times 10^{-6} =$$

$$4.81 \times \frac{1}{1,000,000}$$

$$0.00000481$$

SCIENTIFIC TO STANDARD NOTATION

Use these steps to express a number of the form $a \times 10^n$ in standard notation.

1. Determine whether $n > 0$ or $n < 0$
2. If $n > 0$, move the decimal point in a to the right n places
If $n < 0$, move the decimal point in a to the left n places
3. Add zeros, decimal point, and/or commas as needed to indicate place value

Express each number in standard notation.

$$2.45 \times 10^8$$

$$\underline{\underline{245,000,000}}$$

$$3 \times 10^{-5}$$

$$0.00003$$

STANDARD TO SCIENTIFIC NOTATION

Use these steps to express a number in scientific notation.

1. Place a decimal point to the right of the first nonzero digit. The result is "a"
2. Observe the number of places (n) and the direction to move decimal back to original number
3. If the decimal moves to the right $\Rightarrow a \times 10^n$
If the decimal moves to the left $\Rightarrow a \times 10^{-n}$

Express each number in scientific notation.

30,500,000

$$3.05 \times 10^7$$

0.000781

$$7.81 \times 10^{-4}$$

Products and Quotients with Scientific Notation

Evaluate $(5 \times 10^{-8})(2.9 \times 10^2)$.

Express the result in scientific and standard notation.

$$(5 \cdot 2.9) \cdot (10^{-8} \cdot 10^2)$$

$$14.5 \cdot 10^{-8+2}$$

$$14.5 \cdot 10^{-6}$$

$$1.45 \times 10^1 \times 10^{-6}$$

$$1.45 \times 10^{-5}$$

$$1.45 \times 10^{-5}$$

$$0.0000145$$

Evaluate $\frac{1.2789 \times 10^9}{5.22 \times 10^5}$

Express the result in scientific and standard notation.

$$0.245 \times 10^4$$
$$2.45 \times 10^{-1} \times 10^4$$
$$2.45 \times 10^3$$
$$2,450$$

Assignment:

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