

8-3

Study Guide and Intervention

Scientific Notation

Be Neat!
Box Answers.

READ
THIS
NOW!

YES,
ALL
OF IT!!

Scientific Notation Keeping track of place value in very large or very small numbers written in standard form may be difficult. It is more efficient to write such numbers in scientific notation. A number is expressed in scientific notation when it is written as a product of two factors, one factor that is greater than or equal to 1 and less than 10 and one factor that is a power of ten.

Scientific Notation

A number is in scientific notation when it is in the form $a \times 10^n$, where $1 \leq a < 10$ and n is an integer.

Example 1

Express 3.52×10^4 in standard notation.

$$\begin{aligned} 3.52 \times 10^4 &= 3.52 \times 10,000 \\ &= 35,200 \end{aligned}$$

The decimal point moved 4 places to the right.

Example 3

Express 37,600,000 in scientific notation.

$$37,600,000 = 3.76 \times 10^7$$

The decimal point moved 7 places so that it is between the 3 and the 7. Since $37,600,000 > 1$, the exponent is positive.

Example 2

Express 6.21×10^{-5} in standard notation.

$$\begin{aligned} 6.21 \times 10^{-5} &= 6.21 \times \frac{1}{10^5} \\ &= 6.21 \times 0.00001 \\ &= 0.0000621 \end{aligned}$$

The decimal point moved 5 places to the left.

Example 4

Express 0.0000549 in scientific notation.

$$0.0000549 = 5.49 \times 10^{-5}$$

The decimal point moved 5 places so that it is between the 5 and the 4. Since $0.0000549 < 1$, the exponent is negative.

Exercises

Express each number in standard notation.

1. 3.65×10^5

2. 7.02×10^{-4}

3. 8.003×10^8

4. 7.451×10^6

5. 5.91×10^0

6. 7.99×10^{-1}

7. 8.9354×10^{10}

8. 8.1×10^{-9}

9. 4×10^{15}

Express each number in scientific notation.

10. 0.0000456

11. 0.00001

12. 590,000,000

13. 0.00000000012

14. 0.000080436

15. 0.03621

16. 433×10^4

17. 0.0042×10^{-3}

18. 50,000,000,000