

Study Guide

Scientific Notation

Scientists use scientific notation to express very large or very small numbers. A number is expressed in scientific notation when it is expressed as the product of a number between one and ten, and a power of ten.

Example 1: $37,000 = 3.7 \times 10^4$

Example 2: $0.00391 = 3.91 \times 10^{-3}$

You can find products or quotients of numbers that are expressed in scientific notation by following the rules for multiplying and dividing monomials and powers.

Example 3: $\frac{8.4 \times 10^8}{4.2 \times 10^5} = \frac{8.4}{4.2} \times \frac{10^8}{10^5}$
 $= 2 \times 10^3$, or 2000

Example 4: $(6700)(0.00002)$
 $= (6.7 \times 10^3)(2 \times 10^{-5})$
 $= (6.7 \times 2)(10^3 \times 10^{-5})$
 $= 13.4 \times 10^{-2}$
 $= 1.34 \times 10^{-1}$, or 0.134

Express each number in scientific notation.

1. 0.0000456

2. 0.01

3. 590,000,000

4. 640×10^5

Evaluate. Express each result in scientific and standard notation.

5. $\frac{1.4 \times 10^4}{0.2 \times 10^2}$

6. $\frac{3.3 \times 10^{-12}}{1.1 \times 10^{-14}}$

7. $\frac{0.000042}{600}$

8. $(2 \times 10^4)(4 \times 10^{-5})$

9. $(77 \times 10^4)(0.02 \times 10^3)$

10. $(3.2 \times 10^{-2})(2.0 \times 10^2)$

11. $250,000 \div 0.0005$

12. $(0.00004)(20,000)$

13. $(1.5 \times 10^5)(3.3 \times 10^{-4})$