

## 9-3

NAME \_\_\_\_\_ DATE \_\_\_\_\_

**Scientific Notation** (Pages 506–512)

When dealing with very large numbers, keeping track of place value can be difficult. For this reason, it is not always desirable to express numbers in standard notation. Large numbers such as these may be expressed in **scientific notation**.

<b>Scientific Notation</b>	A number is expressed in scientific notation when it is in the form $a \times 10^n$ , where $1 \leq a < 10$ and $n$ is an integer.
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**EXAMPLES***Express each number in scientific notation.*

**A** 299,000,000  
 $299,000,000$   
 $= 2.99 \times 100,000,000$   
 $= 2.99 \times 10^8$

**B** 0.0000254  
 $0.0000254$   
 $= 2.54 \times 0.00001$   
 $= 2.54 \times \frac{1}{100,000}$   
 $= 2.54 \times 10^{-5}$

*Express each number in standard notation.*

**C**  $3.14 \times 10^6$   
 $3.14 \times 10^6$   
 $= 3.14 \times 1,000,000$   
 $= 3,140,000$

**D**  $7.2 \times 10^{-4}$   
 $7.2 \times 10^{-4}$   
 $= 7.2 \times \frac{1}{10^4}$   
 $= 7.2 \times \frac{1}{10,000}$   
 $= 7.2 \times 0.0001$  or  $0.00072$

**PRACTICE***Express each number in scientific notation.*

1. 3500                      2. 0.0015                      3. 43.8                      4. 285,873,000  
 5. 0.0000000485            6. 0.060406                      7.  $655 \times 10^{-5}$                       8.  $109 \times 10^8$

*Evaluate. Express each result in scientific notation and standard notation.*

9.  $(5.4 \times 10^1)(4 \times 10^4)$             10.  $(6.07 \times 10^{-3})(42 \times 10^{-1})$             11.  $(9 \times 10^6)(20 \times 10^{-4})$   
 12.  $\frac{2.6 \times 10^3}{6.5 \times 10^9}$                       13.  $\frac{9.5 \times 10^8}{1.9 \times 10^2}$                       14.  $\frac{3.51 \times 10^{-7}}{2.7 \times 10^2}$

15. **Chemistry** A mole has  $6.0 \times 10^{23}$  molecules. The molecular mass of water is 18 grams, or 18 moles. How many molecules are there in 18 grams of water? Express your answer in scientific notation.



16. **Standardized Test Practice** Evaluate  $(1.42 \times 10^8) \div (7.1 \times 10^{-3})$ .

- A**  $2 \times 10^4$                       **B**  $2 \times 10^5$                       **C**  $2 \times 10^{10}$                       **D**  $2 \times 10^{11}$

**Answers:** 1.  $3.5 \times 10^3$ ; 2.  $1.5 \times 10^{-5}$ ; 3.  $4.38 \times 10^1$ ; 4.  $2.85873 \times 10^8$ ; 5.  $4.85 \times 10^8$ ; 6.  $6.0406 \times 10^{-2}$ ; 7.  $6.55 \times 10^{-3}$ ; 8.  $1.09 \times 10^{10}$ ; 9.  $2.16 \times 10^{-6}$ ; 10.  $2.5494 \times 10^{-2}$ ; 11.  $1.8 \times 10^4$ ; 12.  $4 \times 10^{-7}$ ; 13.  $5.00000004$ ; 14.  $1.3 \times 10^{-9}$ ; 15.  $1.08 \times 10^{25}$ ; 16. C