

6-9 Scientific Notation (Pages 317–320)

You can use **scientific notation** to write very large or very small numbers. Numbers expressed in scientific notation are written as the product of a factor and a power of 10. The factor must be greater than or equal to 1 and less than 10.

Scientific Notation	<ul style="list-style-type: none"> To write a large positive or negative number in scientific notation, move the decimal point to the right of the left-most digit, and multiply this number by a power of ten. To find the power of ten, count the number of places you moved the decimal point. The procedure is the same for small numbers, except the power of 10 is the negative of the number of places you moved the decimal point.
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EXAMPLES

Write each number in scientific notation.

A 93,000,000

9.3000000. Move the decimal point 7 spaces to the left.

9.3×10^7 Multiply by a factor of 10, which in this case is 10^7 because you moved the decimal point 7 spaces to the left.

B 0.0000622

0.0006.22 Move the decimal point 5 spaces to the right.

6.22×10^{-5} Multiply by 10^{-5} because you moved the decimal point 5 spaces to the right.

C Write 8.3×10^{-4} in standard form.

$$8.3 \times 10^{-4} = 8.3 \times \left(\frac{1}{10}\right)^4$$

$$= 8.3 \times \frac{1}{10,000}$$

$$= 8.3 \times 0.0001 \text{ or } 0.00083 \quad \text{Move the decimal point in 8.3 4 places to the left.}$$

PRACTICE

Write each number in scientific notation.

1. 3,265,000

2. 4,560,000

3. 5,200,000,000

4. 0.00057

5. 0.00000002

6. 73,000,000,000

Write each number in standard form.

7. 5.7×10^6

8. 6.8×10^8

9. 3.2×10^{-5}

10. 6.7×10^{-7}

11. 5.9×10^{12}

12. 3.034579×10^6

13. Chemistry Because atoms are so small, chemists use metric prefixes to describe extremely small numbers. A *femtogram* is 0.000000000000001 of a gram. Write this number in scientific notation.



14. Standardized Test Practice Write 640,000,000, in scientific notation.

A 6.4×10^8

B 6.4×10^{11}

C 6.4×10^{-8}

D 64×10^{-11}

Answers: 1. 3.265×10^6 2. 4.56×10^6 3. 5.2×10^9 4. 5.7×10^{-4} 5. 2.0×10^{-8} 6. 7.3×10^{10} 7. $5,700,000$ 8. 680,000,000 9. 0.000032 10. 0.00000067 11. 5,900,000,000,000 12. 3,034,579 13. 1.0×10^{-15} 14. A
