

Scientific Notation (pages 77–79)

You can write numbers such as 4.5 billion in **scientific notation** by using a power of ten.

Scientific Notation	<p>Numbers expressed in scientific notation are written as the product of a number that is at least one but less than ten and a power of ten. The power of ten is written with an exponent.</p> <p>To write a number in scientific notation, move the decimal point to the right of the first nonzero 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 decimal part of a number written in scientific notation is often rounded to the hundredths place.</p>
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EXAMPLES

A Write 45,692 in scientific notation.

$$\begin{array}{l} \underline{4.5692} \\ 4.5692 \times 10^4 \\ 4.57 \times 10^4 \end{array}$$

Move the decimal point 4 places to get a number between 1 and 10.
You moved the decimal point 4 places so the power of ten is 4.
Round to the nearest hundredth.

B Write 4.5 billion in scientific notation.

$$\begin{array}{l} 4.5 \text{ billion} = 4.5 \times 1,000,000,000 \\ = 4.5 \times 10^9 \quad 10^9 = 1,000,000,000 \\ 4.5 \text{ billion is } 4.5 \times 10^9. \end{array}$$

Try These Together

1. Write 734 in scientific notation.

HINT: Move the decimal point to the right of the 7. Count the number of places you moved the decimal point.

2. Write 93 million in scientific notation.

HINT: Write 93 million in standard form. Then move the decimal point.

PRACTICE

Write each number in scientific notation.

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|--------------|----------------|------------|
| 3. 650 | 4. 5,000 | 5. 8,500 |
| 6. 1,500,000 | 7. 6,070 | 8. 640,000 |
| 9. 3,300 | 10. 28,000,000 | 11. 300 |

Replace each ● with <, >, or = to make a true sentence.

12. 6,000 ● 6×10^2 13. 1,200 ● 1.2×10^4 14. 30,500 ● 3.05×10^2

15. **Money Matters** The national debt of a country is the amount of money it has borrowed from its people or other countries. In 1919, the national debt of the United States was \$25.5 billion dollars. Write \$25.5 billion in scientific notation.



16. **Standardized Test Practice** Comets are clumps of dust and frozen gases floating in the solar system. Recently, pieces of a comet slammed into Jupiter's atmosphere at 210,000 km/h. Write 210,000 in scientific notation.

- A** 2.1×10^4 **B** 2.1×10^2 **C** 2.1×10^3 **D** 2.1×10^5

Answers: 1. 7.34×10^2 2. 9.3×10^7 3. 6.5×10^7 4. 5.0×10^3 5. 8.5×10^3 6. 1.5×10^6 7. 6.07×10^3 8. 6.4×10^5 9. 3.3×10^3 10. 2.8×10^7 11. 3.0×10^2 12. < 13. < 14. > 15. \$2.55 × 10 ¹⁰ 16. D
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