

8.6 Lesson

Key Vocabulary

scientific notation,
p. 350

A number is written in **scientific notation** when it is represented 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.

The factor is greater than or equal to 1 and less than 10.

$$8.3 \times 10^{-7}$$

The power of 10 has an integer exponent.

Key Idea

Writing Numbers in Scientific Notation

Move the decimal point so it is located to the right of the leading nonzero digit. The number of places you moved the decimal point indicates the exponent of the power of 10, as shown below.

Number Greater Than or Equal to 10

Use a positive exponent when you move the decimal point to the left.

$$8600 = 8.6 \times 10^3$$

Number Between 0 and 1

Use a negative exponent when you move the decimal point to the right.

$$0.0024 = 2.4 \times 10^{-3}$$

If the number is greater than or equal to 10, then the exponent is positive. If the number is between 0 and 1, then the exponent is negative.

EXAMPLE 1 Writing Numbers in Scientific Notation

a. Write 173,000,000 in scientific notation.

Move the decimal point 8 places to the left.

$$173,000,000 = 1.73 \times 10^8$$

The number is greater than 10. So, the exponent is positive.

b. Write 0.0000032 in scientific notation.

Move the decimal point 6 places to the right.

$$0.0000032 = 3.2 \times 10^{-6}$$

The number is between 0 and 1. So, the exponent is negative.

Try It Write the number in scientific notation.

1. 50,000

2. 25,000,000

3. 683

4. 0.005

5. 0.00000033

6. 0.000506

Key Idea

Writing Numbers in Standard Form

The absolute value of the exponent indicates how many places to move the decimal point.

- If the exponent is **negative**, move the decimal point to the **left**.
- If the exponent is **positive**, move the decimal point to the **right**.

EXAMPLE 2 Writing Numbers in Standard Form

- a. Write 3.22×10^{-4} in standard form.

$$3.22 \times 10^{-4} = 0.000322 \quad \text{Move the decimal point } |-4| = 4 \text{ places to the left.}$$

- b. Write 7.9×10^5 in standard form.

$$7.9 \times 10^5 = 790,000 \quad \text{Move the decimal point } |5| = 5 \text{ places to the right.}$$

Try It Write the number in standard form.

7. 6×10^7

8. 9.9×10^{-5}

9. 1.285×10^4



Self-Assessment for Concepts & Skills

Solve each exercise. Then rate your understanding of the success criteria in your journal.

WRITING NUMBERS IN SCIENTIFIC NOTATION Write the number in scientific notation.

10. 675,000,000

11. 0.000000084

12. 0.000012001

WRITING NUMBERS IN STANDARD FORM Write the number in standard form.

13. 8×10^{-7}

14. 3.876×10^7

15. 1.11×10^{-5}

16. **WHICH ONE DOESN'T BELONG?** Which number does *not* belong with the other three? Explain.

2.8×10^{15}

4.3×10^{-30}

1.05×10^{28}

10×9.2^{-13}