Scientific Notation

Algebra Worksheet · Grade 7–9

Name: _____ Date: _____

Learning Objectives

- Convert numbers from standard notation to scientific notation
- Convert numbers from scientific notation to standard notation
- Identify the sign of the exponent based on the size of the number

Problems

1. Write the number 0.057 in scientific notation.

0.057

2. Write the number 4,300 in scientific notation.

4300

3. Convert the scientific notation back to standard form.

3.6×10^{4}

4. Convert the scientific notation back to standard form.

7.2×10^{-3}

5. Write the number 0.000049 in scientific notation.

0.000049

6. Write the number 215,000,000 in scientific notation.

$215{,}000{,}000$

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7. Determine whether each number is written in correct scientific notation. Identify any errors and correct them.

52.3×10^4

8. Multiply the two numbers written in scientific notation and express your answer in scientific notation.

$(3.0 \times 10^5) \times (2.0 \times 10^3)$

9. Divide the two numbers written in scientific notation and express your answer in scientific notation.

$$\frac{8.4 \times 10^7}{2.1 \times 10^3}$$

10. The distance from Earth to the Sun is approximately 93,000,000 miles, and the wavelength of blue light is approximately 0.00000047 meters. Write both values in scientific notation, then determine how many times greater the distance to the Sun is compared to the wavelength of blue light.

$$\frac{9.3 \times 10^7}{4.7 \times 10^{-7}}$$

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Scientific Notation — Answer Key

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Answer Key

1. Answer: 5.7 × 10■²

- Find the first non-zero digit: 5
- Move the decimal point 2 places to the right to get 5.7
- Since the original number is less than 1, the exponent is negative: –2
- Answer: 5.7 × 10■²

2. Answer: 4.3 × 10³

- Find the first non-zero digit: 4
- Move the decimal point 3 places to the left to get 4.3
- Since the original number is greater than 10, the exponent is positive: 3
- Answer: 4.3 × 10³

3. Answer: 36,000

- The exponent is 4, so move the decimal point 4 places to the right
- 3.6 → 36,000
- Answer: 36,000

4. Answer: 0.0072

- The exponent is –3, so move the decimal point 3 places to the left
- 7.2 → 0.0072
- Answer: 0.0072

5. Answer: 4.9 × 10■■

- Find the first non-zero digit: 4
- Move the decimal point 5 places to the right to get 4.9
- Since the original number is much less than 1, the exponent is negative: –5
- Answer: 4.9 × 10■■

6. Answer: 2.15 × 10■

- Find the first non-zero digit: 2
- Move the decimal point 8 places to the left to get 2.15
- Since the original number is very large, the exponent is positive: 8
- Answer: 2.15 × 10■

7. Answer: 5.23 × 10■

- In scientific notation, the coefficient must be between 1 and 10
- 52.3 is not between 1 and 10, so adjust: move the decimal one place left → 5.23
- Increase the exponent by 1: 10■ becomes 10■
- Correct form: 5.23 × 10■

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8. Answer: 6.0 × 10■

- Multiply the coefficients: 3.0 × 2.0 = 6.0
- Add the exponents: 5 + 3 = 8
- Combine: 6.0 × 10■
- Check that 6.0 is between 1 and 10 — it is, so no adjustment needed
- Answer: 6.0 × 10■

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9. Answer: 4.0 × 10■

- Divide the coefficients: 8.4 ÷ 2.1 = 4.0
- Subtract the exponents: 7 – 3 = 4
- Combine: 4.0 × 10■
- Check that 4.0 is between 1 and 10 — it is, so no adjustment needed
- Answer: 4.0 × 10■

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10. Answer: ≈ 1.98 × 10^{1}■

- Distance to Sun: 93,000,000 = 9.3 × 10■ miles
- Wavelength of blue light: 0.00000047 = 4.7 × 10■■ meters
- Divide: (9.3 ÷ 4.7) ≈ 1.979
- Subtract exponents: 7 – (–7) = 14
- Combine: 1.979 × 10^{1}■
- Round coefficient: ≈ 1.98
- Answer: The distance to the Sun is approximately 1.98 × 10^{1}■ times greater than the wavelength of blue light

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