MATHEMATICS · GRADES 10-12

Scientific notation with very large and small numbers

Difficulty level: Advanced

Mathematics: Grades 10-12

This document was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

Overview of the concept

This is how you compare the size of a galaxy with the size of an atom on the same page, by writing both numbers in a compact form that shows which is bigger at a glance. An astronomy student can put the distance to a star beside the width of a cell and see immediately how much bigger one is than the other. A chemist comparing a molecule with a grain of sand uses the same short form for both. Knowing scientific notation tells you how to handle numbers across an enormous range without getting lost in zeros.



© 2026 Brett Robbins. All Rights Reserved.

Rule

Scientific notation: a number is written as $a \times 10^n$, where a is at least 1 and less than 10.

The power tells you how many places the decimal point moved, positive for a big number and negative for a small one.

Worked examples

EXAMPLE 1

Q Write 123,000,000 in scientific notation

SOLUTION

Move the decimal point until one non-zero digit is before it: 1.23

Count the places moved: 8 places to the left.

So the number is 1.23×10^8

EXAMPLE 2

Q Write 0.0000045 in scientific notation

SOLUTION

Move the decimal point until one non-zero digit is before it: 4.5

Count the places moved: 6 places to the right.

So the number is 4.5×10^{-6}

© 2026 Brett Robbins. All Rights Reserved.

Practice questions

1 Write 45,000 in scientific notation.

- **A** 4.5×10^{3}
- **B** 4.5×10^{5}
- **C** 4.5×10^{4}
- **D** 45×10^{4}

Understand It with Pulse | Flag a mistake

2 Write 0.00027 in scientific notation.

- **A** 2.7×10^{4}
- **B** 2.7×10^{-4}
- **C** 2.7×10^{-3}
- **D** 27×10^{-4}

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

3 Which is bigger: 7.2×10^6 or 7.2×10^5?

- **A** 7.2×10^6
- **B** 7.2×10^5
- **C** They are equal
- **D** Cannot tell

Understand It with Pulse | Flag a mistake

4 Which is smaller: 9×10^{-7} or 9×10^{-6}?

- **A** 9×10^{-7}
- **B** 9×10^{-6}
- **C** They are equal
- **D** Cannot tell

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

5 The distance to a star is 1.23×10^5 km. How many times bigger is a distance of 1.23×10^6 km?

- **A** 10 times
- **B** 5 times
- **C** 100 times
- **D** 2 times

Understand It with Pulse | Flag a mistake

6 A grain of sand weighs 0.00045 grams. How many places does the decimal point move to write 0.00045 in scientific notation?

- **A** 4 places to the right
- **B** 4 places to the left
- **C** 5 places to the right
- **D** 3 places to the left

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

7 **The number is 6.3×10^5. Which number is it?**

1. 63,000
2. 630,000
3. 6,300,000

Understand It with Pulse | Flag a mistake

8 **Why is the exponent negative when the number is smaller than 1?**

A. A negative exponent means dividing by a power of 10, which makes the number smaller

B. Because the number has a decimal point

C. Because a negative exponent means multiplying by a power of 10

D. Because the number is smaller than 10

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

9 Look at this pattern:
100 is 1×10^2
1,000 is 1×10^3
10,000 is 1×10^4
What is 100,000 in scientific notation?

A 1×10^4

B 1×10^6

C 1×10^5

D 10×10^5

Understand It with Pulse | Flag a mistake

10 Which one of these has a negative exponent?

A 4.5×10^4

B 3.2×10^{-4}

C 7.2×10^6

D 9.8×10^9

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

ANSWER KEY

1. 4.5×10^{4}

2. 2.7×10^{-4}

3. 7.2×10^{6}

4. 9×10^{-7}

5. 10 times

6. 4 places to the right

7. 630,000

8. A negative exponent means dividing by a power of 10, which makes the number smaller

9. 1×10^{5}

10. 3.2×10^{-4}

© 2026 Brett Robbins. All Rights Reserved.