MATHEMATICS · GRADES 7-9

Scientific notation introduction

Difficulty level: Intermediate

Mathematics: Grades 7-9

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Overview of the concept

This is how you write huge numbers like the population of the Earth or tiny ones like the width of a hair in a short form you can actually compare. A student writing the population of the Earth as a long string of digits can lose count of the zeros, but the short form makes it easy to read and compare. A scientist writing the width of a hair avoids a decimal with a string of zeros after it. Knowing scientific notation tells you how to write very big and very small numbers in a compact form that is easy to read and compare.



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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 5,200 in scientific notation



SOLUTION

Move the decimal point until one non-zero digit is left of it: 5.2

Count the places moved: 3 places to the left.

So $5{,}200 = 5.2 \times 10^3$

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EXAMPLE 2

Q Write 0.0046 in scientific notation



SOLUTION

Move the decimal point until one non-zero digit is left of it: 4.6

Count the places moved: 3 places to the right.

So $0.0046 = 4.6 \times 10^{-3}$

Practice questions

1 A town has 3,000 people. Write 3,000 in scientific notation.

- **A** 3×10^{3}
- **B** 3×10^{2}
- **C** 3×10^{4}
- **D** 30×10^{3}

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2 A stadium holds 45,000 people. Write 45,000 in scientific notation.

10000	1000	100	10	1
4	5	0	0	0

A 4.5×10^3

B 4.5×10^4

C 45×10^4

D 4.5×10^5

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3 A seed is 0.007 m long. Write 0.007 in scientific notation.

1	1/10	1/100	1/1000
0	0	0	7

A 7×10^{3}

B 7×10^{-3}

C 7×10^{-2}

D 0.7×10^{-3}

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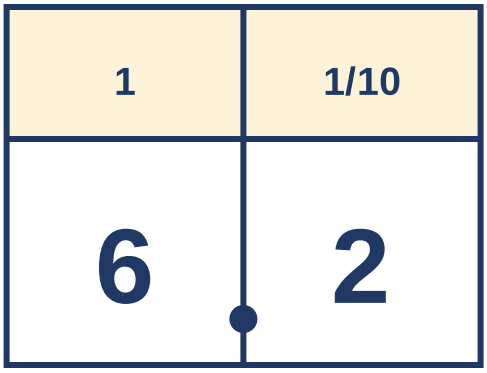
4 A road is 6.2×10^2 m long. Write 6.2×10^2 as an ordinary number.



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5 A lake holds 1.5×10^4 litres of water. How many times bigger is 1.5×10^5 litres?

A 10 times bigger

B 5 times bigger

C 100 times bigger

D 2 times bigger

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6 A coin is 9×10^{-2} cm thick. Write 9×10^{-2} as an ordinary number.

$$\frac{1}{9}$$

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7 A city uses 1.2×10^{5} litres of water in a day. How many zeros are in 120,000 when it is written out as an ordinary number?

A 4

B 5

C 3

D 6

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8 A grain of sand is 0.00052 m across. Which is smaller: 5.2×10^{-4} or 5.2×10^{-3}?

- **A** 5.2×10^{-4}
- **B** 5.2×10^{-3}
- **C** They are equal
- **D** Cannot tell

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9 A box holds 8×10^{0} pencils. Write 8×10^{0} as an ordinary number.

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10 **Which of these is written in proper scientific notation?**

- **A** 70×10^{1}
- **B** 7×10^{2}
- **C** 0.7×10^{3}
- **D** 700×10^{0}

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ANSWER KEY

1. 3×10^{3}

2. 4.5×10^{4}

3. 7×10^{-3}

4. 620

5. 10 times bigger

6. 0.09

7. 4

8. 5.2×10^{-4}

9. 8

10. 7×10^{2}

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