

Standard Form

KS3 Maths · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Write 340,000 in standard form

Step 1 · Identify the front digits: 3.4 (between 1 and 10)

$$a = 3.4$$

Step 2 · Count how many places the decimal point moves left

$$3.4 \ 0 \ 0 \ 0 \ 0 \rightarrow 5 \text{ places} \rightarrow \text{power} = 5$$

Step 3 · Write in standard form

$$3.4 \times 10^5$$

Answer: 3.4×10^5

Check: $3.4 \times 10^5 = 3.4 \times 100,000 = 340,000$ ✓

2. Now try one with the steps

Write 0.000472 in standard form

Step 1 · Move the decimal right to get a number between 1 and 10

Step 2 · Moving RIGHT means a NEGATIVE power

Step 3 · Write in standard form

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Write 47,000 in standard form. [1]

2. Write 0.0035 in standard form. [1]

3. Write 6.02×10^5 ordinary number. [1]

4. Calculate $(3 \times 10^4) \times (2 \times 10^3)$. Give your answer in standard form. [2]

5. Calculate $(8.4 \times 10^5) \div (2 \times 10^2)$. Give in standard form. [2]

6. Work out $(5 \times 10^3) + (4 \times 10^2)$. Give in standard form. [2]

7. Write 9,300,000 in standard form. [1]

8. Write 2.5×10^{-4} ordinary number. [1]

9. Write 0.00008 in standard form. [1]

10. Which is larger: 3.2×10^5 or 9.8×10^4 ? [1]

11. Calculate $(6 \times 10^5) \times (4 \times 10^2)$. Give your answer in standard form. [2]

12. Calculate $(9 \times 10^8) \div (3 \times 10^{-2})$. Give your answer in standard form. [2]

13. Work out $(3.5 \times 10^4) - (8 \times 10^3)$. Give your answer in standard form. [2]

14. Write in order, smallest first: 4.1×10^{-3} , 3.9×10^{-2} , 0.0042, 4×10^{-3} [2]

15. The Sun is about 1.5×10^8 km from Earth. Light travels about 3×10^5 km every second. How many seconds does sunlight take to reach Earth? [3]

16. Work out $(2 \times 10^3)^2$. Give your answer in standard form. [2]

4. Before you hand it in

3.7×10^4 written as 370,000 (writing four zeros after 37)

10^4 means move the decimal point 4 places right: $3.7 \rightarrow 37 \rightarrow 370 \rightarrow 3,700 \rightarrow 37,000$. The power counts places moved, not zeros written.

$0.0048 = 4.8 \times 10^{-3}$ (positive power for a small number)

Numbers less than 1 need a negative power. $0.0048 \rightarrow$ move decimal 3 places right $\rightarrow 4.8 \times 10^{-3}$.

$(3 \times 10^4) \times (4 \times 10^3) = 12 \times 10^{12}$ (multiplying the powers)

Multiply numbers, ADD powers: $3 \times 4 = 12$, $10^4 \times 10^3 = 10^7$. Then adjust: $12 \times 10^7 = 1.2 \times 10^8$.

The 'a' part doesn't have to be between 1 and 10

Standard form requires $1 \leq a < 10$. If you get 12.5×10^3 , adjust to 1.25×10^4 .