

Standard Form Calculations

GCSE Maths · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Work out $(4 \times 10^3) \times (6 \times 10^5)$. Give your answer in standard form.

Step 1 · Multiply the front numbers

$$4 \times 6 = 24$$

Step 2 · Add the powers of 10

$$10^3 \times 10^5 = 10^8$$

Step 3 · 24 is not between 1 and 10: $24 = 2.4 \times 10^1$

$$2.4 \times 10^1 \times 10^8 = 2.4 \times 10^9$$

Answer: 2.4×10^9

Check: $4000 \times 600\,000 = 2\,400\,000\,000$ ✓

2. Now try one with the steps

Work out $(9 \times 10^4) \div (3 \times 10^{-2})$.

Step 1 · Divide the front numbers

Step 2 · Subtract the powers

Answer:

3. Practice

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

1. Write 45 000 000 in standard form. [1]

2. Write 0.00036 in standard form. [1]

3. Write 7.2×10^{-3} ordinary number. [1]

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

5. Work out $(5 \times 10^6) \times (8 \times 10^3)$. Give your answer in standard form. [2]

6. Work out $(8.4 \times 10^9) \div (2.1 \times 10^3)$. Give your answer in standard form. [2]

7. Work out $(6 \times 10^{-3}) \times (7 \times 10^{-5})$. Give your answer in standard form. [2]

8. Work out $(1.5 \times 10^4) \div (5 \times 10^{-2})$. Give your answer in standard form. [2]

9. Work out $6.2 \times 10^5 + 3.1 \times 10^4$. Give your answer in standard form. [2]

10. Work out $4 \times 10^{-3} - 5 \times 10^{-4}$. Give your answer in standard form. [2]

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

12. Write in order, smallest first: 3.1×10^4 , 2.9×10^5 , 8×10^3 , 3.05×10^4 . [2]

13. A virus is 1.2×10^{-7} m long. How many would fit end to end along 3 mm (3×10^{-3} m)? Give your answer ordinary number. [3]

14. Light travels at 3×10^8 m/s. The Sun is about 1.5×10^{11} m from Earth. How many seconds does sunlight take to reach Earth? [3]

15. n is a positive integer. Write $(2.4 \times 10^n) \times (5 \times 10^n)$ in standard form, in terms of n .

[3]

4. Before you hand it in

$$(4 \times 10^3) \times (6 \times 10^5) = 24 \times 10^8$$

24 is not between 1 and 10. Write $24 = 2.4 \times 10$, so the answer is 2.4×10^9 .

$$3.2 \times 10^5 + 4.5 \times 10^4 = 7.7 \times 10^9$$

Adding needs matching powers: $32 \times 10^4 + 4.5 \times 10^4 = 36.5 \times 10^4 = 3.65 \times 10^5$.

$$0.00036 = 3.6 \times 10^4$$

Numbers less than 1 have a negative power. Check: $3.6 \times 10^4 = 36\,000$, which is clearly not 0.00036.

Typing $3.2 \times 10 \times 10^5$ on a calculator

The $\times 10^x$ key already supplies ' $\times 10^$ '. Type 3.2×10^5 , and use brackets around each number when dividing.