Guide to: Standard form

maths Links

Explanation:

A number in standard form is written as $\mathbf{A \times 10^n}$, where $\mathbf{1 \le A < 10}$ and **n** is a whole number (positive for large numbers, negative for small decimals less than 1).

To **multiply or divide** in standard form, multiply or divide the front numbers and use index laws on the powers of 10 (adjusting the final answer if **A** is not between 1 and 10). To **add or subtract**, convert both numbers into ordinary numbers (or the same power of 10) first.

Example 1: Work out $\mathbf{(4.5 \times 10^4) \times (6 \times 10^5)}$. Give your answer in standard form.

Solution:

Multiply front numbers: 4.5 × 6 = **27**

Add powers of 10: $10^4 \times 10^5 = \mathbf{10^9} \rightarrow 27 \times 10^9$

Adjust so $1 \le A < 10$: $27 = 2.7 \times 10^1$

$2.7 \times 10^1 \times 10^9 = 2.7 \times 10^{10}$

Answer: $\mathbf{2.7 \times 10^{10}}$

Example 2: Work out $\mathbf{(3.2 \times 10^{-3}) + (4.8 \times 10^{-4})}$. Give your answer in standard form.

Solution:

Write as ordinary decimals:

$3.2 \times 10^{-3} =$ **0.0032** and $4.8 \times 10^{-4} =$ **0.00048**

Add decimals: 0.0032 + 0.00048 = **0.00368**

Convert back to standard form:

Answer: $\mathbf{3.68 \times 10^{-3}}$

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