GCSE Maths – Number

Standard Form

Worksheet

NOTES

SOLUTIONS

This worksheet will show you how to work out different types of standard form questions. Each section contains a worked example, a question with hints and then questions for you to work through on your own.

Section A

Worked Example

Write 8200 in standard form

Step 1: Work out the base number. The value A in $\boldsymbol{A \times 10^n}$ is the base number.

The base number must be less than 10*, but larger than or equal to* 1*. It is a number that gives the answer when multiplied by* 10^n *for some integer* n*. Here, the base number is* 8.2*.*

Step 2: Work out n, the power of 10 which multiplies with the base number to give the original number.

We now need to work out what we multiply 8.2 *by to get* 8200*. By division:*

$$8200 \div 8.2 = 1000$$

Then, calculate what power of 10 *gives* 1000*.* $10^3 = 1000$*, so* $n = 3$*.*

Step 3: Write the answer in standard form.

$$8200 = \boldsymbol{8.2 \times 10^3}$$

Guided Example

Write 675000 in standard form

Step 1: Work out the base number. The value A in $\boldsymbol{A \times 10^n}$ is the base number.

Step 2: Work out n, the power of 10 which multiplies with the base number to give the original number.

Step 3: Write the answer in standard form.

Now it's your turn!

If you get stuck, look back at the worked and guided examples.

1. Write the following numbers in standard form.

a) 3200000

b) 75

c) 10.57

d) 0.014

e) 0.001002

f) 934.001

g) 100

h) 0.5532

Section B

Worked Example

What number is 5.67×10^{-2}?

Step 1: Work out what number the second part, 10^n, is.

$$10^{-2} = \frac{1}{100} = 0.01$$

Step 2: Multiply the base number by the factor of 10 we have just calculated.

$$5.67 \times 0.01 = \mathbf{0.0567}$$

Guided Example

What number is 6.1×10^4?

Step 1: Work out what number the second part, 10^n, is.

Step 2: Multiply the base number by the factor of 10 we have just calculated.

Now it's your turn!

If you get stuck, look back at the worked and guided examples.

2. Convert these numbers from standard form to ordinary numbers.

a) 4.9×10^3

b) 1.02×10^6

c) 7.5×10^{-3}

d) 6.6×10^{-5}

Section C

Worked Example

Work out $(6.7 \times 10^3) + (3 \times 10^2)$. Write the final answer in standard form.

Step 1: Convert both parts to ordinary numbers.

$$10^3 = 1000$$
$$6.7 \times 1000 = \mathbf{6700}$$

$$10^2 = 100$$
$$3 \times 100 = \mathbf{300}$$

Step 2: Perform the operation on the ordinary numbers.

$$6700 + 300 = \mathbf{7000}$$

Step 3: Convert the result into standard form.

The base number will be 7.

$$7000 \div 7 = 1000$$
$$1000 = 10^3$$

$$7000 = \mathbf{7} \times \mathbf{10^3}$$

Guided Example

Work out $(4.7 \times 10^5) - (7.1 \times 10^4)$. Write the final answer in standard form.

Step 1: Convert both parts to ordinary numbers.

Step 2: Perform the operation on the ordinary numbers.

Step 3: Convert the result into standard form.

Now it's your turn!

If you get stuck, look back at the worked and guided examples.

3. Calculate the following problems, writing the final answer in standard form.

a) $(1.2 \times 10^3) + (5.4 \times 10^2)$

b) $(9.6 \times 10^3) - (7.5 \times 10^3)$

c) $(2.3 \times 10^{-3}) + (6.6 \times 10^{-3})$

d) $(4.5 \times 10^{-1}) - (3.9 \times 10^{-2})$

Section D

Worked Example

Work out $(2 \times 10^3) \times (3 \times 10^2)$. Write the final answer in standard form.

Step 1: Perform the operation on the base numbers.

$$2 \times 3 = \mathbf{6}$$

Step 2: Perform the operation on the index 10^n parts.

If we are multiplying two of the same number (10 in this case) with powers, we simply add the powers!

$$10^3 \times 10^2 = 10^{3+2} = \mathbf{10^5}$$

Step 3: Write the final answer in standard form.

$$(2 \times 10^3) \times (3 \times 10^2) = \mathbf{6 \times 10^5}$$

Guided Example

Work out $(8 \times 10^7) \div (4 \times 10^4)$. Write the final answer in standard form.

Step 1: Perform the operation on the base numbers.

Step 2: Perform the operation on the index 10^n parts.

Step 3: Write the final answer in standard form.

Now it's your turn!

If you get stuck, look back at the worked and guided examples.

4. Calculate the following problems, writing the final answer in standard form.

a) $(5 \times 10^3) \times (7 \times 10^4)$

b) $(9 \times 10^9) \div (3 \times 10^6)$

c) $(4 \times 10^{-1}) \times (2 \times 10^2)$

d) $(7.2 \times 10^6) \div (3.6 \times 10^{-4})$