

GCSE MATHS

Standard form

Worked Solutions

Q1

*

$$6500000 = 6.5 \times 10^6$$

Move the decimal point and compensate with a power of ten.

Q2

*

$$0.000072 = 7.2 \times 10^{-5}$$

Move the decimal point and compensate with a power of ten.

Q3

*

$$903000000 = 9.03 \times 10^8$$

Move the decimal point and compensate with a power of ten.

Q4

*

$$4.06 \div 1000 = 0.00406$$

A negative third power divides by 1000.

Q5

**

$$\begin{aligned} 38 \times 10^5 &= 3.8 \times 10 \times 10^5 \\ &= 3.8 \times 10^6 \end{aligned}$$

Divide 38 by 10.

Increase the exponent by one.

Q6

*

$$0.0062 = 6.2 \times 10^{-3}$$

Move the decimal point three places to the right; use a power of negative three.

Q7

**

$$3(2) \times 10^{4+5}$$

Calculate coefficients and powers separately.

$$6 \times 10^9$$

Write the result in standard form.

Q8

**

$$32 \times 10^3$$

Calculate coefficients and powers separately.

$$3.2 \times 10^4$$

Write the result in standard form.

Q9

**

$$3 \times 10^{8-2}$$

Calculate coefficients and powers separately.

$$3 \times 10^6$$

Write the result in standard form.

Q10

**

$$0.8 \times 10^{-5}$$

Calculate coefficients and powers separately.

$$8 \times 10^{-6}$$

Write the result in standard form.

Q11

**

$$25 \times 10^{-8}$$

Calculate coefficients and powers separately.

$$2.5 \times 10^{-7}$$

Write the result in standard form.

Q12

**

$$\frac{6 \times 4}{3} = 8$$

Calculate the coefficient.

$$10^{5-2-3} = 10^0$$

Combine the powers.

$$8 \times 10^0$$

Write in standard form.

Q13

**

$$(3.2 + 0.45) \times 10^6$$

Use the same power of ten.

$$3.65 \times 10^6$$

Combine the coefficients and write in standard form.

Q14

**

$$(7 - 0.25) \times 10^{-3}$$

Use the same power of ten.

$$6.75 \times 10^{-3}$$

Combine the coefficients and write in standard form.

Q15

**

$$14 \times 10^7$$

Use the same power of ten.

$$1.4 \times 10^8$$

Combine the coefficients and write in standard form.

Q16

**

$$0.0007 < 0.004 < 0.02$$

Compare the ordinary decimals.

Q17

$$\frac{6 \times 10^8}{1.5 \times 10^6} = 4 \times 10^2$$

Divide both terms by the second quantity.

$$400 : 1$$

Write the requested ratio.

Q18

$$23 \times 10^{n-1} = 230000$$

Express both terms using the smaller power.

$$10^{n-1} = 10000 = 10^4$$

Divide by 23.

$$n = 5$$

Compare indices.

Q19

$$N = 1/(2.5 \times 10^{-6})$$

Divide total length by one length.

$$N = 4 \times 10^5$$

Write in standard form.

Q20

$$t = \frac{6 \times 10^8}{2.4 \times 10^6} = 2.5 \times 10^2$$

Divide file size by transfer rate.

Q21

$$h = (8 \times 10^{-2})(2.5 \times 10^4) = 2000 \text{ mm}$$

Multiply thickness by count.

$$h = 2000/1000 = 2 \text{ m}$$

Convert millimetres to metres.

Q22

$$V = (3 \times 10^{-4})^3 = 27 \times 10^{-12}$$

Cube the coefficient and the power.

$$V = 2.7 \times 10^{-11} \text{ m}^3$$

Write in standard form.

Q23

$$\text{difference} = 1.2 \times 10^6$$

Subtract the populations.

$$\frac{1.2 \times 10^6}{4 \times 10^6} \times 100 = 30\%$$

Divide the increase by the original population.

Q24

$$\text{(a)} \quad AB = 6 \times 10^{2n+2} = 6 \times 10^{12}$$

Multiply the expressions.

$$2n + 2 = 12 \Rightarrow n = 5$$

Compare indices.

$$\text{(b)} \quad A + B = 3 \times 10^5 + 2 \times 10^7$$

Substitute.

$$A + B = 2.03 \times 10^7$$

Use a common power.