The Maths Society

Forms of numbers

Standard Form

5 7 8

hundreds Place — Tens place — Ones place

Expanded Form

500 + 70 + 8

hundreds Place + tens place + ones place

2310000

$= 2.31 \times 10^{6}$

7.689×10^{2}

$= 768.9$

Question 1

Write 5.17×10^{-3} as an ordinary number. [1]

0.00517

Question 2

Work out, giving your answer in standard form. [2]

$$1.2 \times 10^{40} + 1.2 \times 10^{41}$$

$10^{40}(1.2 + 12)$

$13.2 \times 10^{40} = 1.32 \times 10^{41}$

Question 3

(a) Write 14 835 correct to the nearest thousand. [1]

15000

(b) Write your answer to **part (a)** in standard form. [1]

1.5×10^{4}

Question 4

Write in standard form.

(a) 2 470 000 [1]

2.47×10^{6}

(b) 0.0079 [1]

7.9×10^{-3}

Question 5

Write 1.27×10^{-3} as an ordinary number. [1]

0.00127

Question 6

Write 0.0000574 in standard form. [1]

5.74×10^{-5}

Question 7

Write 1.7×10^{-4} as an ordinary number. [1]

0.00017

Question 8

Write 270000 in standard form. [1]

2.7×10^{5}

Question 9

Write 53400000 in standard form. [1]

5.34×10^{7}

Question 10

(a) Write 2.8×10^2 as an ordinary number. [1]

280

(b) Work out $2.5 \times 10^8 \times 2 \times 10^{-2}$.
Give your answer in standard form. [2]

5×10^6

Question 11

Work out $4 \times 10^{-5} \times 6 \times 10^{12}$.
Give your answer in standard form.

24×10^7

2.4×10^6

[2]

Question 12

$p = 4 \times 10^5$ $q = 5 \times 10^4$

Find, giving your answer in standard form,

(a) pq,

20×10^9

2×10^{10}

(b) $\frac{q}{p}$. [2]

$\frac{5 \times 10^4}{4 \times 10^5} = 1.25 \times 10^{-1}$

Question 13

The price of a ticket for a football match is \$124. [1]

(a) Calculate the amount received when 76 500 tickets are sold.

76500×124

$= 9486000$

(b) Write your answer to **part (a)** in standard form.

9.486×10^6 [1]

Question 1

A hummingbird beats its wings 24 times per second.

(a) Calculate the number of times the hummingbird beats its wings in one hour. [1]

24×3600

$= 86400$

(b) Write your answer to part (a) in standard form. [1]

8.64×10^4

Question 2

(a) Write 16 460 000 in standard form. [1]

1.646×10^7

(b) Calculate $7.85 \div (2.366 \times 10^2)$, giving your answer in standard form. [2]

0.03318

$= 3.318 \times 10^{-2}$

Question 3

Work out $\dfrac{240^2}{5 \times 10^6}$.

Give your answer in standard form. [2]

$\dfrac{576 \times 10^2}{5 \times 10^6} = 115.2 \times 10^{-4}$

$= 1.152 \times 10^{-2}$

Question 4

Calculate the value of $5(6 \times 10^3 + 400)$, giving your answer in standard form. [2]

$5 \times (6000 + 400)$

$= 5 \times 64 \times 10^2$

$= 32000 = 3.2 \times 10^4$

Question 5

Change 64 square metres into square millimetres.
Give your answer in standard form. [2]

$64m^2 \longrightarrow 640000\,cm^2 \longrightarrow 6400000\,mm^2$

$= 6.4 \times 10^7\ mm^2$

Question 6

$\sqrt{23}$ $\quad$ 48% $\quad$ 4.80 $\quad$ $\frac{53}{11}$ $\quad$ 4.8181

$4.796 \quad 0.48 \quad 4.8$ [2]

Write the numbers in order of size with the **largest** first.

$\frac{53}{11}, 4.80, \sqrt{23}, 48\%$

Question 7

1 second = 10^6 microseconds. [2]

Change 3×10^{13} microseconds into minutes. Give your answer in standard form.

$10^6 = 1$ sec

$3 \times 10^{13} = ?$

$= \frac{3 \times 10^{13}}{10^6} = 3 \times 10^7$ sec

$= \frac{3 \times 10^7}{6 \times 10} = 0.5 \times 10^6 = 5 \times 10^5$ min

Question 8

A light on a computer comes on for 26 700 microseconds.

One microsecond is 10^{-6} seconds.

Work out the length of time, in seconds, that the light is on

(a) in standard form, [1]

1 micro $= 10^{-6}$ sec

$26700 = ?$

$= 267 \times 10^2 \times 10^{-6}$

$= 2.67 \times 10^{-2}$ sec

(b) as a decimal. [1]

0.0267

Question 9

Use the formula

$$P = \frac{V^2}{R}$$

to calculate the value of P when $V = 6 \times 10^6$ and $R = 7.2 \times 10^8$. [2]

$P = \frac{36 \times 10^{12}}{7.2 \times 10^8} = 5 \times 10^4$

Question 10

The planet Neptune is 4496000 000 kilometres from the Sun.
Write this distance in standard form. [1]

4.496×10^9

Question 11

The mass of the Earth is $\frac{1}{95}$ of the mass of the planet Saturn. [3]

The mass of the Earth is 5.97×10^{24} kilograms.
Calculate the mass of the planet Saturn, giving your answer in standard form, correct to 2 significant figures.

Earth $= \frac{1}{95} \times$ Saturn

$5.97 \times 10^{24} \times 95 =$ Saturn

$5.6715 \times 10^{22} =$ Saturn

$5.7 \times 10^{22} =$ Saturn

Question 12

A block of cheese, of mass 8 kilograms, is cut by a machine into 500 equal slices.

(a) Calculate the mass of one slice of cheese in kilograms.

0.016 kg

[1]

(b) Write your answer to **part (a)** in standard form.

1.6×10^{-2} kg

[1]

Question 1

(a) Write 0.0605 in standard form. [1]

6.05×10^{-2}

(b) Calculate $0.1 \times 5.1 \times 10^4$, giving your answer in standard form. [1]

5.1×10^3

Question 2

Write the answer to the following calculations in standard form.

(a) $600 \div 8000$ [2]

7.5×10^{-2}

(b) $10^8 - 7 \times 10^6$ [2]

$10^6 (100 - 7)$

$93 \times 10^6 = 9.3 \times 10^7$

Question 3

Calculate $(4.3 \times 10^8) + (2.5 \times 10^7)$.

Give your answer in standard form. [2]

$10^7 (43 + 2.5)$

45.5×10^7

4.55×10^8

Question 4

Calculate, giving your answers in standard form,

(a) $2 \times (5.5 \times 10^4)$, [2]

11.0×10^4

(b) $(5.5 \times 10^4) - (5 \times 10^4)$. [2]

$0.5 \times 10^4 = 5 \times 10^3$

Question 5

Work out $2(3 \times 10^8 - 4 \times 10^6)$, giving your answer in standard form. [2]

$2 \times 10^6 \ (300 - 4)$

$2 \times 10^6 \times 296$

$592 \times 10^6 = 5.92 \times 10^8$

Question 6

Solve the equation $4x + 6 \times 10^3 = 8 \times 10^4$.

Give your answer in standard form. [3]

$4x = 10^3 \ (80 - 6)$

$4x = 74000$

$x = 1.85 \times 10^4$

Question 7

(a) There are 10^9 nanoseconds in 1 second.
Find the number of nanoseconds in 5 minutes, giving your answer in standard form.

$1 \text{ sec} = 10^9$

$300 \text{ sec} = 3 \times 10^{11}$

[2]

(b) Solve the equation $5(x + 3 \times 10^6) = 4 \times 10^7$.

$x + 3 \times 10^6 = 8 \times 10^6$

$x = 10^6 \times 5$

[2]