# Chhetri Academy

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GCSE MATHS

Number

Edexcel 1MA1 | Subtopic collection Topic 07

# Standard form

## Higher tier

Past paper question booklet

| 59 | 2003-2025 | Higher |
| --- | --- | --- |
| question groups | available papers | tier |

### Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

**Name** _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

**10.** A spaceship travelled for $6 \times 10^2$ hours at a speed of $8 \times 10^4$ km/h.

*Leave blank*

(a) Calculate the distance travelled by the spaceship.
Give your answer in standard form.

.....km
**(3)**

One month an aircraft travelled $2 \times 10^5$ km.
The next month the aircraft travelled $3 \times 10^4$ km.

(b) Calculate the total distance travelled by the aircraft in the two months.
Give your answer as an ordinary number.

..... km
**(2)**

**9.** $y^2 = \dfrac{ab}{a+b}$

*Leave blank*

$a = 3 \times 10^8$
$b = 2 \times 10^7$

Find $y$.
Give your answer in standard form correct to 2 significant figures.

$y =$ .....

**(3)**

**6.** A floppy disk can store 1 440 000 bytes of data.

(a) Write the number 1 440 000 in standard form.

.....

**(1)**

A hard disk can store $2.4 \times 10^9$ bytes of data.

(b) Calculate the number of floppy disks needed to store the $2.4 \times 10^9$ bytes of data.

.....

**(3)**

**9.** Work out $(3.2\times10^{5}) \times (4.5\times10^{4})$
Give your answer in standard form correct to 2 significant figures.

.....

**Q9**

**(Total 2 marks)**

**10**. (a) Write $5.7 \times 10^{-4}$ as an ordinary number.

.....

**(1)**

(b) Work out the value of $(7 \times 10^4) \times (3 \times 10^5)$

Give your answer in standard form.

.....

**(2)**

**(Total 3 marks)**

**Q10**

**10.** (a) (i) Write 7900 in standard form.

.....

(ii) Write 0.00035 in standard form.

.....

**(2)**

(b) Work out $\dfrac{4\times10^{3}}{8\times10^{-5}}$

Give your answer in standard form.

.....

**(2)**

**(Total 4 marks)**

Blank

**Q10**

**15.** (a) Write 64 000 in standard form.

.....

**(1)**

(b) Write $156 \times 10^{-7}$ in standard form.

.....

**(1)** **Q15**

**(Total 2 marks)**

**13.** (a) Write in standard form 213 000

.....
**(1)**

(b) Write in standard form 0.00123

.....
**(1)**

**Q13**

**(Total 2 marks)**

**18.** (a) Write 15 500 in standard form.

.....

**(1)**

(b) Write $2.48 \times 10^{-3}$ as an ordinary number.

.....

**(1)**

(c) Work out the value of

$$24\ 500 \div (1.25 \times 10^{-4})$$

Give your answer in standard form.

.....

**(2)**

**Q18**

**(Total 4 marks)**

**17.** (a) Write 82 500 000 in standard form.

.....

**(1)**

(b) Work out $(5.2 \times 10^{-7}) \times (2.8 \times 10^{-9})$

Give your answer in standard form.

.....

**(2)**

**(Total 3 marks)**

Q17

**13** Work out $(2.5 \times 10^9) \div (5 \times 10^3)$.
Give your answer in standard form.

.....

**(Total for Question 13 is 2 marks)**

**19.** The surface area of Earth is 510 072 000 km$^2$.
The surface area of Jupiter is $6.21795 \times 10^{10}$ km$^2$.

The surface area of Jupiter is greater than the surface area of Earth.
How many times greater?
Give your answer in standard form.

.....

**Q19**

**(Total 3 marks)**

**13.** (a) Work out the value of $(6 \times 10^8) \times (4 \times 10^7)$

Give your answer in standard form.

.....

**(2)**

(b) Work out the value of $(6 \times 10^8) + (4 \times 10^7)$

Give your answer in standard form.

.....

**(2)**

**(Total 4 marks)**

Q13

**11** (a) Write 60 800 000 in standard form.

.....

**(1)**

(b) Write $1.7 \times 10^{-4}$ as an ordinary number.

.....

**(1)**

**(Total for Question 11 is 2 marks)**

**17** (a) Write down the value of $10^0$

.....

**(1)**

(b) Write $6.7 \times 10^{-5}$ as an ordinary number.

.....

**(1)**

(c) Work out the value of $(3 \times 10^7) \times (9 \times 10^6)$
Give your answer in standard form.

.....

**(2)**

**(Total for Question 17 is 4 marks)**

**19** $p^2 = \dfrac{x - y}{xy}$

$x = 8.5 \times 10^9$
$y = 4 \times 10^8$

Find the value of $p$.
Give your answer in standard form correct to 2 significant figures.

.....

**(Total for Question 19 is 3 marks)**

**12** An object is travelling at a speed of 2650 metres per second.

How many seconds will the object take to travel a distance of $3.45 \times 10^{10}$ metres?
Give your answer in standard form, correct to 2 significant figures.

..... seconds

**(Total for Question 12 is 3 marks)**

**19** Rob is learning about the planets.

Rob makes a model of the Sun.
He also makes a model of the planet Jupiter.

Rob is going to hang the two models in the school hall.

Rob wants a distance of 16 m between the two models.
The real distance between the planet Jupiter and the Sun is $8 \times 10^8$ km.

Work out the scale Rob should use.
Give your answer in the form $1 : n$

.....

**(Total for Question 19 is 3 marks)**

**10** (a) Write 125 000 in standard form.

.....

**(1)**

(b) Write $8 \times 10^{-4}$ as an ordinary number.

.....

**(1)**

**(Total for Question 10 is 2 marks)**

**17** (a) Write 55 000 in standard form.

.....

**(1)**

(b) Work out $(3.6 \times 10^9) \times (5 \times 10^{-4})$
Write your answer as an ordinary number.

.....

**(2)**

**(Total for Question 17 is 3 marks)**

**16** (a) Write $8.2 \times 10^5$ as an ordinary number.

.....

**(1)**

(b) Write 0.000 376 in standard form.

.....

**(1)**

(c) Work out the value of $(2.3 \times 10^{12}) \div (4.6 \times 10^3)$
Give your answer in standard form.

.....

**(2)**

**(Total for Question 16 is 4 marks)**

**15** (a) Write 0.0037 in standard form.

.....

**(1)**

(b) Write $4.9 \times 10^4$ as an ordinary number.

.....

**(1)**

(c) Work out the value of

$$\frac{500}{250 \times 10^3}$$

Give your answer in standard form.

.....

**(2)**

**(Total for Question 15 is 4 marks)**

***15** One sheet of paper is $9 \times 10^{-3}$ cm thick.

Mark wants to put 500 sheets of paper into the paper tray of his printer.
The paper tray is 4 cm deep.

Is the paper tray deep enough for 500 sheets of paper?
You must explain your answer.

**(Total for Question 15 is 3 marks)**

**16** Work out $\dfrac{4 \times 10^9 + 3.2 \times 10^7}{1.6 \times 10^{-6}}$

Give your answer in standard form.

.....

**(Total for Question 16 is 2 marks)**

**14** (a) Write down the reciprocal of 5

.....

**(1)**

(b) Evaluate $3^{-2}$

.....

**(1)**

(c) Calculate $9 \times 10^4 \times 3 \times 10^3$
Give your answer in standard form.

.....

**(2)**

**(Total for Question 14 is 4 marks)**

**19** (a) Write $7.8 \times 10^{-4}$ as an ordinary number.

.....

**(1)**

(b) Write 95 600 000 as a number in standard form.

.....

**(1)**

**(Total for Question 19 is 2 marks)**

**9** (a) Write 152 million in standard form.

.....

**(2)**

(b) Write $2.4 \times 10^{-3}$ as an ordinary number.

.....

**(1)**

**(Total for Question 9 is 3 marks)**

**15** (a) (i) Use your calculator to work out $\dfrac{\sqrt{46.2 - 17.5}}{2.39 \times 0.7}$

Write down all the figures on your calculator display.

.....

(ii) Give your answer to (i) correct to 3 significant figures.

.....

**(3)**

(b) Work out $(2.34 \times 10^5) \times (5 \times 10^4)$
Give your answer in standard form.

.....

**(2)**

**(Total for Question 15 is 5 marks)**

**15** (a) (i) Use your calculator to work out $\dfrac{\sqrt{46.2 - 17.5}}{2.39 \times 0.7}$

Write down all the figures on your calculator display.

.....

(ii) Give your answer to (i) correct to 3 significant figures.

.....

**(3)**

(b) Work out $(2.34 \times 10^5) \times (5 \times 10^4)$
Give your answer in standard form.

.....

**(2)**

**(Total for Question 15 is 5 marks)**

**16** Work out the value of $(7.5 \times 10^4) \times (2.5 \times 10^3)$
Give your answer in standard form.

.....

**(Total for Question 16 is 2 marks)**

**16** (a) Write $4.5 \times 10^{-3}$ as an ordinary number.

.....

**(1)**

(b) Work out the value of $(2.5 \times 10^{-2}) \div (3.8 \times 10^{3})$
Give your answer in standard form correct to 3 significant figures.

.....

**(2)**

**(Total for Question 16 is 3 marks)**

**15** (a) Write 450 000 in standard form.

.....

**(1)**

(b) Write $3.2 \times 10^{-4}$ as an ordinary number.

.....

**(1)**

(c) Work out $\sqrt[3]{6.4 \times 10^{10}}$

.....

**(1)**

**(Total for Question 15 is 3 marks)**

**15** (a) Work out the value of $25^{-3}$

.....

**(1)**

(b) Work out the value of $350^3$
Give your answer in standard form.

.....

**(2)**

**(Total for Question 15 is 3 marks)**

**12** Work out $\dfrac{(2.6 \times 10^7) - (5 \times 10^6)}{2.8 \times 10^{-3}}$

Give your answer in standard form.

.....

**(Total for Question 12 is 2 marks)**

**16** (a) Write 640 000 000 in standard form.

.....

**(1)**

(b) Work out $(3 \times 10^7) \div (6 \times 10^4)$
Give your answer in standard form.

.....

**(2)**

**(Total for Question 16 is 3 marks)**

**11** (a) Write 0.0078 in standard form.

.....

**(1)**

(b) Write $6.71 \times 10^6$ as an ordinary number.

.....

**(1)**

(c) Write these numbers in order of size.

Start with the smallest number.

$9^{\frac{1}{2}}$ 0.9 $-9$ $9^0$

.....

**(2)**

**(Total for Question 11 is 4 marks)**

## Question 37



**16** Work out the value of $(3.5 \times 10^{6}) \div (5 \times 10^{-3})$
Give your answer in standard form.

.....

**(Total for Question 16 is 2 marks)**

**11** (a) Write 0.000 59 in standard form.

.....

**(1)**

(b) Write $3.8 \times 10^5$ as an ordinary number.

.....

**(1)**

**(Total for Question 11 is 2 marks)**

**11** (a) Calculate the value of $\dfrac{\sqrt{100 - 4.5^3}}{0.73}$

Give your answer correct to 3 decimal places.

.....

**(2)**

(b) Calculate the value of $\dfrac{1.2 \times 10^3}{3 \times 10^5}$

Give your answer in standard form.

.....

**(2)**

**(Total for Question 11 is 4 marks)**

**20** William is building a planetary path for people to walk along.
The planetary path will have a model of the Sun and models of the planets.

William uses two different scales.
He uses

1 cm to 1000 km for the diameter of each planet

1 m to 1 000 000 km for the distance from the Sun to each planet

William makes a model of the planet Venus.
The model has a diameter of 12.1 cm.

(a) Work out the real diameter of the planet Venus.
Give your answer in standard form.

..... km
**(2)**

William works out the distance from the model of the Sun to the model of the planet Neptune.

The real distance from the Sun to the planet Neptune is $4.503\times10^{9}$ km.

(b) Work out the distance from the model of the Sun to the model of the planet Neptune.
Give your answer in km, correct to 1 decimal place.

..... km
**(3)**

**(Total for Question 20 is 5 marks)**

**12** (a) Write $2.3 \times 10^{-4}$ as an ordinary number.

.....

**(1)**

The populations of 3 cities A, B and C are shown in the table below.

| City | Population |
|---|---|
| A | $5.86 \times 10^6$ |
| B | 4 200 000 |
| C | 5.3 million |

(b) Write the cities in order of the size of their population.
Show the city with the greatest size of population first.

.....

**(2)**

**(Total for Question 12 is 3 marks)**

**18** (a) Write 5 400 000 as a number in standard form.

.....

**(1)**

(b) Write $3.2 \times 10^{-4}$ as an ordinary number.

.....

**(1)**

The mass of the Sun is $2 \times 10^{30}$ kg.
The mass of the largest known star is 315 times the mass of the Sun.

(c) Work out the mass of this star.
Give your answer in kg in standard form.

..... kg

**(2)**

**(Total for Question 18 is 4 marks)**

## Question 43



**8** (a) Write $7.97 \times 10^{-6}$ as an ordinary number.

.....

**(1)**

(b) Work out the value of $(2.52 \times 10^{5}) \div (4 \times 10^{-3})$
Give your answer in standard form.

.....

**(2)**

**(Total for Question 8 is 3 marks)**

**10** The table shows some information about eight planets.

| Planet | Distance from Earth (km) | Mass (kg) |
|---|---|---|
| Earth | 0 | $5.97 \times 10^{24}$ |
| Jupiter | $6.29 \times 10^{8}$ | $1.898 \times 10^{27}$ |
| Mars | $7.83 \times 10^{7}$ | $6.42 \times 10^{23}$ |
| Mercury | $9.17 \times 10^{7}$ | $3.302 \times 10^{23}$ |
| Neptune | $4.35 \times 10^{9}$ | $1.024 \times 10^{26}$ |
| Saturn | $1.28 \times 10^{9}$ | $5.68 \times 10^{26}$ |
| Uranus | $2.72 \times 10^{9}$ | $8.683 \times 10^{25}$ |
| Venus | $4.14 \times 10^{7}$ | $4.869 \times 10^{24}$ |

(a) Write down the name of the planet with the greatest mass.

.....

**(1)**

(b) Find the difference between the mass of Venus and the mass of Mercury.

..... kg

**(1)**

Nishat says that Neptune is over a hundred times further away from Earth than Venus is.

(c) Is Nishat right?
You must show how you get your answer.

**(2)**

**(Total for Question 10 is 4 marks)**

## Question 45



**9** $T = \sqrt{\frac{w}{d^3}}$

$w = 5.6 \times 10^{-5}$
$d = 1.4 \times 10^{-4}$

(a) Work out the value of $T$.
Give your answer in standard form correct to 3 significant figures.

$T =$ .....

**(2)**

$w$ is increased by 10%
$d$ is increased by 5%

Lottie says,

"The value of $T$ will increase because both $w$ and $d$ are increased."

(b) Lottie is wrong.
Explain why.

.....

.....

**(2)**

**(Total for Question 9 is 4 marks)**

**7** (a) Write the number $0.000\,086\,23$ in standard form.

.....

**(1)**

(b) Work out $\dfrac{3.2 \times 10^{3} + 5.1 \times 10^{-2}}{4.3 \times 10^{-4}}$

Give your answer in standard form, correct to 3 significant figures.

.....

**(2)**

**(Total for Question 7 is 3 marks)**

**8** (a) Write 0.00562 in standard form.

.....

**(1)**

(b) Write $1.452 \times 10^3$ as an ordinary number.

.....

**(1)**

**(Total for Question 8 is 2 marks)**

## Question 48



**7** Work out $(3.42 \times 10^{-7}) \div (7.5 \times 10^{-6})$
Give your answer in standard form.

.....

**(Total for Question 7 is 2 marks)**

**7** (a) Write 32 460 000 in standard form.

.....

**(1)**

(b) Write $4.96 \times 10^{-3}$ as an ordinary number.

.....

**(1)**

Asma was asked to compare the following two numbers.

$$A = 6.212 \times 10^{8} \quad \text{and} \quad B = 4.73 \times 10^{9}$$

She says,

"6.212 is bigger than 4.73 so $A$ is bigger than $B$."

(c) Is Asma correct?
You must give a reason for your answer.

.....

.....

.....

**(1)**

**(Total for Question 7 is 3 marks)**

**10** A person's heart beats approximately $10^5$ times each day.
A person lives for approximately 81 years.

(a) Work out an estimate for the number of times a person's heart beats in their lifetime.
Give your answer in standard form correct to 2 significant figures.

.....

**(2)**

$2 \times 10^{12}$ red blood cells have a total mass of 90 grams.

(b) Work out the average mass of 1 red blood cell.
Give your answer in standard form.

..... grams

**(2)**

**(Total for Question 10 is 4 marks)**

**3** (a) Write $4.5 \times 10^5$ as an ordinary number.

.....

**(1)**

(b) Write 0.007 in standard form.

.....

**(1)**

(c) Work out $4.2 \times 10^3 + 5.3 \times 10^2$
Give your answer in standard form.

.....

**(2)**

**(Total for Question 3 is 4 marks)**

**4** (a) Write $1.63 \times 10^{-3}$ as an ordinary number.

.....

**(1)**

(b) Write $438\,000$ in standard form.

.....

**(1)**

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

.....

**(2)**

**(Total for Question 4 is 4 marks)**

**9** (a) Write $6.75 \times 10^{-4}$ as an ordinary number.

.....

**(1)**

(b) Work out $\dfrac{2.56 \times 10^{6} \times 4.12 \times 10^{-3}}{1.6 \times 10^{-2}}$

Give your answer in standard form.

.....

**(2)**

**(Total for Question 9 is 3 marks)**

## Question 54



**1** (a) Write 468 000 in standard form.

.....

**(1)**

(b) Write $5.037 \times 10^{-4}$ as an ordinary number.

.....

**(1)**

**(Total for Question 1 is 2 marks)**

**2** (a) (i) Write $5.3 \times 10^4$ as an ordinary number.

.....

**(1)**

(ii) Write $7.4 \times 10^{-5}$ as an ordinary number.

.....

**(1)**

(b) Calculate the value of $9.7 \times 10^6 + 2.45 \times 10^7$
Give your answer in standard form.

.....

**(2)**

**(Total for Question 2 is 4 marks)**

## Question 56



**8** $1.25 \times 10^{-12} = k \times (4 \times 10^{-20})$

Work out the value of $k$.
Give your answer in standard form.

$k =$ .....

**(Total for Question 8 is 2 marks)**

## Question 57



**2** (a) Write $3.402 \times 10^5$ as an ordinary number.

.....

**(1)**

(b) Write 0.8026 in standard form.

.....

**(1)**

**(Total for Question 2 is 2 marks)**

**5** Work out $5.7 \times 10^2 + 9.8 \times 10^3$
Give your answer in standard form.

.....

**(Total for Question 5 is 3 marks)**

## Question 59



**9** (a) Write $5.73 \times 10^6$ as an ordinary number.

.....

**(1)**

(b) Write 0.035 in standard form.

.....

**(1)**

**(Total for Question 9 is 2 marks)**