

Paper Reference 4MA1/1H
Pearson Edexcel
International GCSE

Total Marks

Mathematics A
PAPER 1H
Higher Tier
(Calculator)

Wednesday 8 November 2023 – Morning

Time: 2 hours

In the boxes below, write your name, centre number and candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

Q73465A

YOU MUST HAVE

Ruler, protractor, compasses, writing and drawing equipment, calculator. Tracing paper may be used.

YOU WILL BE GIVEN

**Diagram Booklet
Formulae Pages**

INSTRUCTIONS

Answer ALL questions.

Without sufficient working, correct answers may be awarded no marks.

Answer the questions in the spaces provided in this Question Paper or on the separate diagrams – there may be more space than you need.

CALCULATORS MAY BE USED.

You must NOT write anything on the Formulae Pages. Anything you write on the Formulae Pages will gain NO credit.

INFORMATION

The total mark for this paper is 100.

The marks for EACH question are shown in brackets – use this as a guide as to how much time to spend on each question.

**You may be provided with a model for Question 21
It is NOT accurate.**

There may be spare copies of some diagrams in case you need them.

ADVICE

Read each question carefully before you start to answer it.

Check your answers if you have time at the end.

4

Answer ALL TWENTY FOUR questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

Turn over

1. Look at the diagram for Question 1 in the Diagram Booklet.

It is a Venn diagram.

List the members of the set

(a) A

(1 mark)

(b) $A \cap B$

(1 mark)

(continued on the next page)

Turn over

1. continued.

List the members of the set

(c) $(A \cup B)'$

(1 mark)

(Total for Question 1 is 3 marks)

2. (a) Factorise fully
 $12pq - 18p$
(2 marks)
-

(continued on the next page)

2. continued.

There are 56 metal bars in a box.

Each metal bar is gold or silver or zinc.

y metal bars are gold.

$(3y + 7)$ metal bars are silver.

$(2y - 5)$ metal bars are zinc.

(b) Work out the number of metal bars that are zinc.

Show clear algebraic working.

(4 marks)

Answer space continues on the next page.

2. (b) continued.

(Total for Question 2 is 6 marks)

Turn over

3. Joshua buys a car for **\$12 500**

He sells the car to Nina.

Nina pays

- a deposit of **\$1500**
- followed by **36** monthly payments of **\$450**

Work out Joshua's percentage profit.

(4 marks)

Answer space continues on the next page.

3. continued.

_____ %

(Total for Question 3 is 4 marks)

4. Look at the table for Question 4 in the Diagram Booklet.

A biased spinner has three sections each of a different colour.

The table in the Diagram Booklet shows the probability that, when the spinner is spun once, it will land on blue or on orange or on white.

- (a) Work out the value of X
(2 marks)

Answer space continues on the next page.

4. (a) continued.

x = _____

(continued on the next page)

4. continued.

The spinner is spun **250** times.

(b) Work out an estimate for the number of times the spinner will land on blue.

(2 marks)

(Total for Question 4 is 4 marks)

Turn over

5. Look at the diagram for Question 5 in the Diagram Booklet.

It is NOT accurately drawn.

It shows a shaded shape made from three identical semicircles, **X**, **Y** and **Z**

ABCDE is a straight line.

AC is the diameter of semicircle **X** and **B** is the centre of semicircle **X**

BD is the diameter of semicircle **Y** and **C** is the centre of semicircle **Y**

CE is the diameter of semicircle **Z** and **D** is the centre of semicircle **Z**

$$AC = BD = CE = 20 \text{ cm}$$

Work out the perimeter of the shaded shape.

Give your answer correct to the nearest whole number.

(3 marks)

Answer space is on the next page.

5. continued.

_____ cm

(Total for Question 5 is 3 marks)

Turn over

6. Look at the information for Question 6 in the Diagram Booklet.

Juan wants to buy a ticket to fly from Madrid to Berlin.

Using the information in the Diagram Booklet, work out the difference between the normal price of ticket **A** and the normal price of ticket **B**

(4 marks)

Answer space continues on the next page.

6. continued.

_____ euros

(Total for Question 6 is 4 marks)

7. $A = 5^3 \times 7^3 \times 11^6$ and
 $B = 5^6 \times 7^2 \times 11^4$

Find the highest common factor (HCF) of **A** and **B**

Give your answer as a product of powers of its
prime factors.

(2 marks)

Answer space continues on the next page.

7. continued.

(Total for Question 7 is 2 marks)

8. (a) Solve the inequality

$$8x - 4 \geq 3x - 10$$

(2 marks)

(continued on the next page)

8. continued.

Look at the diagram for Question 8(b) in the Diagram Booklet.

The region **R**, shown shaded in the diagram, is bounded by three straight lines.

- (b) Write down the three inequalities that define the region **R**
(3 marks)

(Total for Question 8 is 5 marks)

Turn over

9. (a) Write

5.87×10^{-4} as an ordinary number.

(1 mark)

(b) Write

84 000 000 in standard form.

(1 mark)

(continued on the next page)

9. continued.

The number of neurons in a human brain is

$$8.5 \times 10^{10}$$

The number of neurons in a monkey brain is

$$1.47 \times 10^9$$

The number of neurons in a human brain is

$K \times$ the number of neurons in a monkey brain.

(c) Work out the value of K

Give your answer correct to one decimal place.

(2 marks)

Answer space continues on the next page.

9. (c) continued.

K = _____

(Total for Question 9 is 4 marks)

10. Look at the diagram for Question 10 in the Diagram Booklet.

It is NOT accurately drawn.

It shows triangle **ABC**

ADB is a straight line.

AB = 22 metres

CD = 8 metres

Angle CAB = 40°

Angle CDB is a right angle.

Angle CBA = x°

Work out the value of x

Give your answer correct to one decimal place.

Show your working clearly.

(5 marks)

Answer space continues on the next page.

10. continued.

X = _____

(Total for Question 10 is 5 marks)

Turn over

11. Express

$\frac{3}{4} + \frac{5-x}{6x}$ as a single fraction in its simplest

terms.

(3 marks)

Answer space continues on the next page.

11. continued.

(Total for Question 11 is 3 marks)

Turn over

12. (a) Complete the table of values for

$$y = x^3 - 3x + 1$$

There are four spaces to fill.

(2 marks)

x	y
-2	
-1	
0	
1	-1
2	

(continued on the next page)

Turn over

12. continued.

(b) Look at the diagram for Question 12(b) in the Diagram Booklet.

It is a grid.

On the grid, draw the graph of

$$y = x^3 - 3x + 1 \text{ for values of } x \text{ from } -2 \text{ to } 2$$

(2 marks)

Look at the diagram for Question 12(c) in the Diagram Booklet.

It shows four graphs labelled **A**, **B**, **C** and **D**

(c) Write down the letter of the graph that could have the equation

$$y = -\frac{1}{x^2}$$

(1 mark)

(Total for Question 12 is 5 marks)

Turn over

13. Look at the diagram for Question 13 in the Diagram Booklet.

It is a cumulative frequency graph giving information about the times, in seconds, that 80 adults took to log in to an online bank.

**(a) Find an estimate for the median time.
(1 mark)**

_____ seconds

(continued on the next page)

13. continued.

(b) Work out the percentage of these adults that took longer than **50** seconds to log in.

Show your working clearly.

(3 marks)

_____ %

(Total for Question 13 is 4 marks)

Turn over

14. Look at the diagram for Question 14 in the Diagram Booklet.

It is NOT accurately drawn.

On the diagram **A**, **B** and **C** are points on a circle, centre **O**

Angle **OAC** = 52°

Find the size of angle **ABC**

Give reasons for your working.

(3 marks)

Answer space continues on the next page.

14. continued.

_____ ○

(Total for Question 14 is 3 marks)

15. Make n the subject of the formula

$$x = \frac{3p + n}{3n - 4}$$

(3 marks)

Answer space continues on the next page.

15. continued.

(Total for Question 15 is 3 marks)

16. A curve has equation

$$y = 4x^3 - 8x + 5$$

Find the **X** coordinates of the two points on the curve where the gradient is $\frac{1}{3}$

(4 marks)

Answer space continues on the next two pages.

16. continued.

16. continued.

(Total for Question 16 is 4 marks)

17. Look at the diagram for Question 17 in the Diagram Booklet.

It is a histogram giving information about the weights, in grams, of some oranges in a box.

30 of these oranges weigh less than 20 grams.

Medium oranges weigh between 35 grams and 55 grams.

Work out an estimate for the number of medium oranges in the box.

(3 marks)

Answer space continues on the next page.

17. continued.

(Total for Question 17 is 3 marks)

18. Look at the diagram for Question 18 in the Diagram Booklet.

It is NOT accurately drawn.

It shows the positions of three villages, **A**, **B** and **C**

The bearing of **B** from **A** is 054°

The bearing of **C** from **B** is 132°

The distance from **A** to **B** is 3.6 km

The distance from **B** to **C** is 8.4 km

Melur walks from **A** to **B**

She then walks from **B** to **C** and from **C** to **A**

Melur walks at an average speed of 6 km/h

Work out the total time Melur takes.

Give your answer in hours and minutes.

(5 marks)

Answer space continues on the next page.

18. continued.

_____ hours _____ minutes

(Total for Question 18 is 5 marks)

Turn over

19. Here are the first 4 terms in an arithmetic sequence.

3 7 11 15

The last term of the sequence is X

The sum of the terms of the sequence is 7260

Find the value of X

Show clear algebraic working.

(6 marks)

Answer space continues on the next two pages.

19. continued.

Turn over

19. continued.

X = _____

(Total for Question 19 is 6 marks)

20. A bag contains only **10** cent coins and **20** cent coins.

Josip takes at random a coin from the bag, records its value and replaces it in the bag.

He then takes at random a second coin from the bag, records its value and replaces it in the bag.

Josip finds the mean value of the two coins.

The probability that the two coins have a mean value of **10** cents is $\frac{49}{121}$

Work out the probability that the two coins have a mean value of **15** cents.

(4 marks)

Answer space continues on the next two pages.

20. continued.

20. continued.

(Total for Question 20 is 4 marks)

21. Look at Diagram 1, Diagram 2 and Diagram 3 for Question 21 in the Diagram Booklet.

You may be provided with a model.

They are NOT accurate.

They show a triangular prism **ABCDEF**

Diagram 1 and the model show a 3D view.

Diagram 2 shows the triangular face **DEF**

Diagram 3 shows the sloping face **AFDC**

AD = 53 cm

DF = 28 cm

Angle FDE = 30°

Angles AFD and DEF are right angles.

Work out the volume of the triangular prism.

Give your answer correct to the nearest whole number.

(5 marks)

Answer space continues on the next two pages.

21. continued.

21. continued.

_____ cm^3

(Total for Question 21 is 5 marks)

22. [In this question 1 cm = 1 unit on the x -axis and 1 cm = 1 unit on the y -axis]

P is a point on a circle with centre $(0, 0)$

The coordinates of P are $(8, -10)$

The line L is the tangent to the circle at the point P

L crosses the x -axis at the point Q and crosses the y -axis at the point R

Work out the length of RQ

Give your answer correct to 3 significant figures.

(6 marks)

Answer space continues on the next two pages.

22. continued.

22. continued.

_____ cm

(Total for Question 22 is 6 marks)

23. Look at the table for Question 23 in the Diagram Booklet.

Solid **A** is similar to solid **B**

The table shows some information about solid **A** and solid **B**

Work out the height of solid **B**

Give your answer as a decimal.

(5 marks)

Answer space continues on the next three pages.

23. continued.

Turn over

23. continued.

Turn over

23. continued.

_____ cm

(Total for Question 23 is 5 marks)

24. The curve with equation $f(x) = 5x^2 + 9x + 2$ is transformed to the curve with equation

$$g(x) = 5(x + 4)^2 + 9(x + 4) + 8$$

by the translation $\begin{pmatrix} a \\ b \end{pmatrix}$

- (a) Write down the value of **a** and the value of **b**
(2 marks)

a = _____

b = _____

(continued on the next page)

24. continued.

Look at the diagram for Question 24(b) in the Diagram Booklet.

It shows the graph of $y = p \cos(x + q)^\circ$ for $0 \leq x \leq 360$ drawn on a grid.

Given that $p > 0$ and $0 < q < 360$

(b) find the value of p and the value of q
(2 marks)

$p =$ _____

$q =$ _____

(Total for Question 24 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

END OF PAPER
