

Paper Reference 4MA1/1H  
Pearson Edexcel  
International GCSE

Total Marks
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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					

**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.**

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**Answer ALL TWENTY FOUR questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

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)

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(b)  $A \cap B$

(1 mark)

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(continued on the next page)

1. continued.

List the members of the set

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

(1 mark)

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(Total for Question 1 is 3 marks)

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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.

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(Total for Question 2 is 6 marks)

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**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)

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- 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)**

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

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**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)

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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)

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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.

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(Total for Question 7 is 2 marks)

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8. (a) Solve the inequality

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

(2 marks)

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(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)

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(Total for Question 8 is 5 marks)

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Turn over

9. (a) Write

$5.87 \times 10^{-4}$  as an ordinary number.

(1 mark)

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(b) Write

84 000 000 in standard form.

(1 mark)

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(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)**

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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 =  $40^\circ$**

**Angle CDB is a right angle.**

**Angle CBA =  $x^\circ$**

**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)**

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**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.

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(Total for Question 11 is 3 marks)

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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**

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

**(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**

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

**(1 mark)**

\_\_\_\_\_

**(Total for Question 12 is 5 marks)**

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**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)

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**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  $OAC = 52^\circ$**

**Find the size of angle ABC**

**Give reasons for your working.**

**(3 marks)**

**Answer space continues on the next page.**

14. continued.

\_\_\_\_\_o

(Total for Question 14 is 3 marks)

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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.

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

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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.

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(Total for Question 16 is 4 marks)

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**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.

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(Total for Question 17 is 3 marks)

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**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  $054^\circ$**

**The bearing of C from B is  $132^\circ$**

**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)

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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.

19. continued.

**x** = \_\_\_\_\_

(Total for Question 19 is 6 marks)

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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.

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(Total for Question 20 is 4 marks)

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**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  $AFDC$**

**$AD = 53 \text{ cm}$**

**$DF = 28 \text{ cm}$**

**Angle  $FDE = 30^\circ$**

**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.

\_\_\_\_\_  $\text{cm}^3$

(Total for Question 21 is 5 marks)

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22. [In this question  $1 \text{ cm} = 1 \text{ unit}$  on the  $x$ -axis and  $1 \text{ cm} = 1 \text{ unit}$  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)**

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**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.

23. continued.

**23. continued.**

\_\_\_\_\_ cm

**(Total for Question 23 is 5 marks)**

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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)**

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**TOTAL FOR PAPER IS 100 MARKS**

**END OF PAPER**

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