

Paper Reference 4MA1/1HR  
Pearson Edexcel  
International GCSE

Total Marks
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Mathematics A  
PAPER: 1HR  
Higher Tier  
(Calculator)

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.**

**Turn over**

## **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.**

**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 FIVE 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 shows a biased spinner.

When the spinner is spun once, the probabilities that it lands on red or on yellow or on green are given in the table.

Colour	Probability
red	0·25
yellow	0·2
purple	
green	0·2

(continued on the next page)

**1. continued.**

**(a) Work out the probability that the spinner lands on red or on yellow.**

**(1 mark)**

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**(continued on the next page)**

**1. continued.**

**Yang is going to spin the spinner 300 times.**

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

**(3 marks)**

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**(Total for Question 1 is 4 marks)**

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**Turn over**

2. Look at the diagram for Question 2 in the Diagram Booklet.

It is NOT accurately drawn.

In a warehouse there are two types of shelves, type **R** and type **S**

These two types of shelves are arranged into shelving units that form a sequence of patterns.

The first three terms in the sequence are shown in the Diagram Booklet.

(continued on the next page)

**2. continued.**

The width of each type **R** shelf is **2·4** metres and the width of each type **S** shelf is **3·5** metres.

**(a) Work out the total width of a shelving unit that has 6 type **R** shelves.**

**(2 marks)**

\_\_\_\_\_ metres

**(continued on the next page)**

**Turn over**

2. continued.

A shelving unit has  $n$  type  $R$  shelves.

The total width of this shelving unit is  $W$  metres.

(b) Find an expression for  $W$  in terms of  $n$

Give your answer in its simplest form.

(2 marks)

$W =$  \_\_\_\_\_

(Total for Question 2 is 4 marks)

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3. Look at the diagram for Question 3 in the Diagram Booklet.

It shows five cards.

Each card has a number written on it.

The mean of the five numbers is 12

Work out the value of  $x$

(3 marks)

Answer space continues on the next page.

**3. continued.**

**X =** \_\_\_\_\_

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

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4. The language department of a college has 180 students.

Each student studies exactly one of French, German, Italian or Spanish.

15 students study French.

45% of the students study German.

Express the percentage of students studying Italian or Spanish as a percentage of those studying French or German.

(4 marks)

Answer space continues on the next page.

14

4. continued.

\_\_\_\_\_ %

(Total for Question 4 is 4 marks)

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Turn over

5. (a) Expand  
 $3c^3(c + 4)$   
(2 marks)
- 

(continued on the next page)

5. continued.

(b) (i) Factorise

$$y^2 + 8y - 9$$

(2 marks)

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(continued on the next page)

Turn over

5. (b) continued.

(ii) Hence, solve

$$y^2 + 8y - 9 = 0$$

(1 mark)

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

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6. Show that

$$2\frac{2}{3} + 3\frac{3}{4} = 6\frac{5}{12}$$

(Total for Question 6 is 3 marks)

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Turn over

7. Look at Diagram 1 and Diagram 2 for Question 7 in the Diagram Booklet.

They are NOT accurately drawn.

Diagram 1 shows the front view and Diagram 2 shows the top view of a solid cylinder made from iron.

The cylinder has diameter **18 cm** and height **3.5 cm**

The mass of the cylinder is **7.04 kg**

Work out the density of the iron.

Give your answer in  **$\text{g/cm}^3$**  correct to **2** significant figures.

**(3 marks)**

Answer space continues on the next page.

7. continued.

\_\_\_\_\_ g/cm<sup>3</sup>

(Total for Question 7 is 3 marks)

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Turn over

8. Jane bought a new car for \$18 000

The car depreciates in value by 15% each year.

Work out the value of the car at the end of 4 years.

Give your answer correct to the nearest \$

\$ \_\_\_\_\_

(Total for Question 8 is 3 marks)

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Turn over

9. Solve the inequality

$$3 - 4y \leq 11$$

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(Total for Question 9 is 2 marks)

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

**It shows the line  $L$  drawn on a grid.**

**Find an equation for  $L$**

**Give your answer in the form  $y = mx + c$**

**(3 marks)**

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

10. continued.

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(Total for Question 10 is 3 marks)

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11. Look at the diagram for Question 11 in the Diagram Booklet.

It is NOT accurately drawn.

The diagram shows a quadrilateral **ABCD**

In the diagram, **ABC** and **DAC** are right-angled triangles.

$$BC = 6 \text{ cm}$$

$$AC = 7.5 \text{ cm}$$

The area of quadrilateral **ABCD** is  $31.5 \text{ cm}^2$

Work out the length of **AD**

(6 marks)

Answer space continues on the next two pages.

11. continued.

Turn over

11. continued.

\_\_\_\_\_ cm

(Total for Question 11 is 6 marks)

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Turn over

12.  $P = 3^3 \times 5^2 \times 7$   
 $Q = 3^2 \times 5 \times 7^2$

(a) Write down the highest common factor (HCF) of  
**P** and **Q**

(1 mark)

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(continued on the next page)

12. continued.

$$P = 3^3 \times 5^2 \times 7$$

$$Q = 3^2 \times 5 \times 7^2$$

(b) Work out the value of  $P^3 \times Q$

Give your answer in the form

$3^x \times 5^y \times 7^z$  where  $x$ ,  $y$  and  $z$  are positive integers.

(2 marks)

Answer space continues on the next page.

12. (b) continued.

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(Total for Question 12 is 3 marks)

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13. Here is the number of runs scored by a baseball team in each of its **15** games this season.

The number of runs have been arranged in order of size.

0	1	1	3	5
6	7	7	8	9
9	12	12	15	16

Work out the interquartile range of the number of runs.

(2 marks)

Answer space continues on the next page.

13. continued.

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(Total for Question 13 is 2 marks)

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Turn over

**14. Solve the simultaneous equations**

$$3x - 5y = 25$$

$$4x + 3y = 14$$

**Show clear algebraic working.**

**(4 marks)**

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

14. continued.

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

**y** = \_\_\_\_\_

(Total for Question 14 is 4 marks)

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Turn over

**15. Look at the diagram for Question 15 in the Diagram Booklet.**

**It is NOT accurately drawn.**

**It shows a circle.**

**P, Q, R and S are points on the circle with centre O**

**PS is a diameter of the circle.**

**Angle PQR =  $136^\circ$**

**Work out the size of angle RPS**

**(3 marks)**

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

15. continued.

\_\_\_\_\_o

(Total for Question 15 is 3 marks)

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16. (a) Expand and simplify

$$(3y - 1)(y + 2)(3y + 1)$$

(3 marks)

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

16. (a) continued.

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(continued on the next page)

Turn over

16. continued.

(b) Simplify fully

$$\left(\frac{2e^5}{8ef^2}\right)^{-2}$$

(3 marks)

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(Total for Question 16 is 6 marks)

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Turn over

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

**It is NOT accurately drawn.**

**It shows a parallelogram PQRS, in which angle SPQ is acute.**

$$\mathbf{PQ = 6.1\text{ cm}}$$

$$\mathbf{PS = 3.8\text{ cm}}$$

**The area of the parallelogram is  $18\text{ cm}^2$**

**Work out the length of QS**

**Give your answer correct to 3 significant figures.**

**(5 marks)**

**Answer space continues on the next two pages.**

17. continued.

Turn over

17. continued.

\_\_\_\_\_ cm

(Total for Question 17 is 5 marks)

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18. Look at Diagram 1, Diagram 2 and Diagram 3 for Question 18 in the Diagram Booklet.

They are NOT accurately drawn.

Diagram 1 shows a cube **ABCDEFGH** with sides of length **6 cm**

Diagram 2 shows the front view of the cube.

Diagram 3 shows the side view of the cube.

**T** is the midpoint of **AB** and **V** is the midpoint of **CH**

Work out the distance from **T** to **V** in a straight line through the cube.

Give your answer in the form  $\sqrt{a}$  cm where **a** is an integer.

(4 marks)

Answer space continues on the next two pages.

18. continued.

Turn over

**45**

**18. continued.**

\_\_\_\_\_ **cm**

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

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**Turn over**

**19. Look at the diagram for Question 19 in the Diagram Booklet.**

**It shows a histogram.**

**The histogram gives information about the height,  $h$  cm, of each tree in part of a forest.**

**There are no trees for which  $h \leq 200$  and for which  $h > 800$**

**The number of trees for which  $300 < h \leq 400$  is 8 fewer than the number of trees for which  $400 < h \leq 500$**

**Work out an estimate for the number of trees in this part of the forest that have a height greater than 500 cm**

**(3 marks)**

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

19. continued.

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(Total for Question 19 is 3 marks)

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Turn over

20. An artist makes two similar metal statues, statue **A** and statue **B**

The volume of statue **B** is 20% less than the volume of statue **A**

The surface area of statue **B** is  $k\%$  less than the surface area of statue **A**

Work out the value of  $k$

Give your answer correct to 3 significant figures.

(4 marks)

Answer space continues on the next page.

**20. continued.**

**k = \_\_\_\_\_**

**(Total for Question 20 is 4 marks)**

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**Turn over**

21. Express  $\frac{3 + \sqrt{8}}{(\sqrt{2} - 1)^2}$  in the form  $p + \sqrt{q}$  where  $p$  and  $q$  are integers.

Show each stage of your working clearly.

(4 marks)

Answer space continues on the next page.

**21. continued.**

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**(Total for Question 21 is 4 marks)**

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**Turn over**

**22. Look at the diagram for Question 22 in the Diagram Booklet.**

**It is NOT accurately drawn.**

**The diagram shows a sketch of part of the curve with equation  $y = x^2 - \frac{p}{x}$  where  $p$  is a positive constant.**

**For all values of  $p$ , the curve has exactly one turning point and this turning point is a minimum shown as the point  $T$  in the sketch.**

**For the curve where the  $x$  coordinate of  $T$  is  $-3$**

- (a) find the value of  $p$**   
**(4 marks)**

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

**22. (a) continued.**

**p = \_\_\_\_\_**

**(continued on the next page)**

**Turn over**

**22. continued.**

The line with equation  $y = k$  is a tangent to the curve with equation  $y = x^2 - \frac{16}{x}$

**(b) Find the value of  $k$**

**(3 marks)**

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

22. (b) continued.

$k =$  \_\_\_\_\_

(Total for Question 22 is 7 marks)

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Turn over

23. (a) Express  $2x^2 - 12x + 3$  in the form  $a(x + b)^2 + c$  where  $a$ ,  $b$  and  $c$  are integers.  
(3 marks)

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(continued on the next page)

Turn over

**23. continued.**

The curve **C** has equation

$$y = 2(x + 4)^2 - 12(x + 4) + 3$$

The point **M** is the minimum point on **C**

**(b) Find the coordinates of M**

**(2 marks)**

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

23. (b) continued.

( \_\_\_\_\_ , \_\_\_\_\_ )

(Total for Question 23 is 5 marks)

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Turn over

**24. Elliot has  $X$  counters.**

**Each counter has one red face and one green face.**

**Elliot spreads all the counters out on a table and sees that the number of counters showing a red face is 5**

**Elliot then picks at random one of the counters and turns the counter over.**

**He then picks at random a second counter and turns the counter over.**

**The probability that there are still 5 counters showing a red face is  $\frac{19}{32}$**

**Work out the value of  $X$**

**Show clear algebraic working.**

**(5 marks)**

**Answer space continues on the next two pages.**

**Turn over**

24. continued.

Turn over

**24. continued.**

**X =** \_\_\_\_\_

**(Total for Question 24 is 5 marks)**

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**Turn over**

25. The sum of the first 10 terms of an arithmetic series is 4 times the sum of the first 5 terms of the same series.

The 8th term of this series is 45

Find the first term of this series.

Show clear algebraic working.

(5 marks)

Answer space continues on the next two pages.

25. continued.

Turn over

25. continued.

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(Total for Question 25 is 5 marks)

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**TOTAL FOR PAPER IS 100 MARKS**

**END OF PAPER**

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