

Paper Reference 4MA1/1HR
Pearson Edexcel
International GCSE

Total Marks

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**

Turn over

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.

Turn over

5

Answer ALL TWENTY FIVE 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 shows a biased spinner.

(continued on the next page)

1. continued.

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)

Turn over

1. continued.

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

(1 mark)

(continued on the next page)

Turn over

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)

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

10

1. (b) continued.

(Total for Question 1 is 4 marks)

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)

Answer space continues on the next page.

2. (a) continued.

_____ 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)

Answer space continues on the next page.

2. (b) continued.

W = _____

(Total for Question 2 is 4 marks)

Turn over

- 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 two pages.

3. continued.

Turn over

3. continued.

X = _____

(Total for Question 3 is 3 marks)

Turn over

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 two pages.

4. continued.

Turn over

4. continued.

_____ %

(Total for Question 4 is 4 marks)

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)

(continued on the next page)

Turn over

5. (b) continued.

(ii) Hence, solve

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

(1 mark)

(Total for Question 5 is 5 marks)

Turn over

6. Show that

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

(3 marks)

Answer space continues on the
next page.

6. continued.

(Total for Question 6 is 3 marks)

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 g/cm^3 correct to 2 significant figures.

(3 marks)

Answer space is on the next two pages.

Turn over

7. continued.

Turn over

7. continued.

_____ **g/cm³**

(Total for Question 7 is 3 marks)

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 \$**

(3 marks)

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

8. continued.

\$ _____

(Total for Question 8 is 3 marks)

Turn over

9. Solve the inequality

$$3 - 4y \leq 11$$

(Total for Question 9 is 2 marks)

Turn over

- 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 two pages.

10. continued.

Turn over

10. continued.

(Total for Question 10 is 3 marks)

Turn over

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.

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

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

The area of quadrilateral ABCD is 31.5 cm^2

(continued on the next page)

Turn over

11. continued.

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)

Turn over

40

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)

(continued on the next page)

Turn over

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.

(Total for Question 12 is 3 marks)

Turn over

- 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 is on the next page.

13. continued.

(Total for Question 13 is 2 marks)

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 two pages.

14. continued.

Turn over

14. continued.

x = _____

y = _____

(Total for Question 14 is 4 marks)

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 is on the next two pages.

Turn over

15. continued.

Turn over

15. continued.

○

(Total for Question 15 is 3 marks)

Turn over

16. (a) Expand and simplify

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

(3 marks)

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

16. (a) continued.

(continued on the next page)

Turn over

16. continued.

(b) Simplify fully

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

(3 marks)

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

Turn over

16. (b) continued.

(Total for Question 16 is 6 marks)

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 cm^2**

(continued on the next page)

Turn over

17. continued.

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)

Turn over

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**

(continued on the next page)

Turn over

18. continued.

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

18. continued.

_____ **cm**

(Total for Question 18 is 4 marks)

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 $400 < h \leq 500$

(continued on the next page)

Turn over

19. continued.

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.

Turn over

19. continued.

(Total for Question 19 is 3 marks)

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 is on the next two pages.

Turn over

20. continued.

Turn over

20. continued.

k = _____

(Total for Question 20 is 4 marks)

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 two pages.

21. continued.

Turn over

21. continued.

(Total for Question 21 is 4 marks)

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.

(continued on the next page)

22. continued.

**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 two pages.

22. (b) continued.

Turn over

22. (b) continued.

k = _____

(Total for Question 22 is 7 marks)

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)

Answer space continues on the next page.

Turn over

23. (a) continued.

(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)

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.

(continued on the next page)

Turn over

24. continued.

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.**

24. continued.

Turn over

24. continued.

X = _____

(Total for Question 24 is 5 marks)

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 three pages.

25. continued.

Turn over

25. continued.

Turn over

25. continued.

(Total for Question 25 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

END OF PAPER
