

Paper Reference 4MA1/1H
Pearson Edexcel
International GCSE

Total Marks

Mathematics A
PAPER 1H
Higher Tier
(Calculator)

Time: 2 hours plus your additional time allowance.

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 Book
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.

There may be spare copies of some diagrams.

**You may be provided with a model for Question 22
It is NOT accurate.**

ADVICE

Read each question carefully before you start to answer it.

Check your answers if you have time at the end.

Good luck with your examination.

Answer all TWENTY SIX questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1. A plane flew from Madrid to Dubai.**

The distance the plane flew was 5658 km

The flight time was 8 hours 12 minutes.

Work out the average speed of the plane.

(3 marks)

Answer space continues on the next page.

1. continued.

_____ km/h

(Total for Question 1 is 3 marks)

2. Here are the first 4 terms of an arithmetic sequence.

85

79

73

67

Find an expression, in terms of n , for the n th term of the sequence.

(Total for Question 2 is 2 marks)

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

It is NOT accurately drawn.

It shows the shape **ABCDE**

$$AB = x \text{ cm}$$

$$BC = 8 \text{ cm}$$

$$AE = 14 \text{ cm}$$

$$ED = 13 \text{ cm}$$

All the marked angles are right angles.

The area of the shape is 91.8 cm^2

Work out the value of **x**

(4 marks)

Answer space continues on the next page.

3. continued.

x = _____

(Total for Question 3 is 4 marks)

Turn over

4. On a farm there are chickens, ducks and pigs.

The ratio of the number of chickens to the number of ducks is $7:2$

The ratio of the number of ducks to the number of pigs is $5:9$

There are 36 pigs on the farm.

Work out the number of chickens on the farm.

(3 marks)

Answer space continues on the next page.

4. continued.

(Total for Question 4 is 3 marks)

5. (a) Expand and simplify

$$3y(2y + 3) - y(3y + 5)$$

(2 marks)

(continued on the next page)

5. continued.

(b) Make t the subject of the formula

$$p = mt - q$$

(2 marks)

(continued on the next page)

5. continued.

Given that

$$\frac{w^5 \times w^n}{w^3} = w^{10}$$

(c) work out the value of n
(2 marks)

$n =$ _____

(Total for Question 5 is 6 marks)

6. Look at the diagram and the table for Question 6 in the Diagram Book.

Grace has a biased 5-sided spinner.

Grace is going to spin the arrow on the spinner once.

The table in the Diagram Book gives the probabilities that the spinner will land on red or on blue or on green.

The probability that the spinner will land on orange is 3 times the probability that the spinner will land on pink.

(continued on the next page)

6. continued.

(a) Work out the probability that the spinner will land on orange.

(3 marks)



(continued on the next page)

6. continued.

Grace spins the arrow on the spinner **150** times.

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

(2 marks)

(Total for Question 6 is 5 marks)

7. y is an integer and

$$-4 \leq 2y < 6$$

(a) Write down all the possible values of y
(2 marks)

(continued on the next page)

7. continued.

(b) Solve the inequality

$$7t - 3 \leq 2t + 31$$

Show your working clearly.

(2 marks)

(Total for Question 7 is 4 marks)

Turn over

8. Look at the table for Question 8 in the Diagram Book.

It shows the populations of four countries.

(a) Work out the difference between the population of China and the population of Germany.

Give your answer in standard form.

(2 marks)

(continued on the next page)

8. continued.

Given that

$$\text{population of Fiji} = \frac{1}{k} \times \text{population of Sweden}$$

(b) work out the value of k

Give your answer correct to the nearest whole number.

(2 marks)

Answer space continues on the next page.

8. (b) continued.

$k =$ _____

(Total for Question 8 is 4 marks)

9. (a) Factorise fully

$$25m^4n^7p + 45m^9n^3q$$

(2 marks)

(continued on the next page)

9. continued.

(b) Solve

$$(2y + 5)^2 = (2y + 3)(2y - 1)$$

(3 marks)

$y =$ _____

(Total for Question 9 is 5 marks)

Turn over

10. Jethro has sat **5** tests.

Each test was marked out of **100** and Jethro's mean mark for the **5** tests is **74**

Jethro has to sit one more test that is also to be marked out of **100**

Jethro wants his mean mark for all **6** tests to be at least **77**

Work out the least mark that Jethro needs to get for the last test.

(3 marks)

Answer space continues on the next page.

10. continued.

(Total for Question 10 is 3 marks)

11. Given that

$$\sqrt{2} \times 16 = 2^x$$

(a) find the value of x

Show your working clearly.

(2 marks)

$x =$ _____

(continued on the next page)

11. continued.

Given that

$$\frac{(11^{-6})^5}{11^4} = 11^n$$

(b) find the value of n

Show your working clearly.

(2 marks)

$n =$ _____

(Total for Question 11 is 4 marks)

12. Look at the diagram for Question 12 in the Diagram Book.

It is NOT accurately drawn.

It shows a sector of a circle with radius 7 cm

An angle of 50° is marked on the diagram.

Work out the length of the arc of the sector.

Give your answer correct to one decimal place.

(2 marks)

Answer space continues on the next page.

12. continued.

_____ cm

(Total for Question 12 is 2 marks)

13. Expand and simplify

$$4y(3y + 1)(2y - 3)$$

Show your working clearly.

(3 marks)

Answer space continues on the next page.

13. continued.

(Total for Question 13 is 3 marks)

14. Here is the number of goals that Henri's team scored one summer in each water polo match.

5 8 9 11 13 13
14 15 16 17 20

Find the interquartile range of the numbers of goals.
Show your working clearly.

(2 marks)

Answer space continues on the next page.

14. continued.

(Total for Question 14 is 2 marks)

15. Look at the diagram for Question 15 in the Diagram Book.

It is NOT accurately drawn.

P, Q and R are points on a circle, centre **O**
TRV is the tangent to the circle at **R**

Reflex angle **POR** = 238°

Angle **QRV** = 60°

Calculate the size of angle **OPQ**

Give a reason for each stage of your working.

(4 marks)

Answer space continues on the next page.

15. continued.

_____ o

(Total for Question 15 is 4 marks)

16. Use algebra to show that the recurring decimal

$$0.28\dot{1}\dot{3} = \frac{557}{1980}$$

(Total for Question 16 is 2 marks)

17. Using algebra, prove that, given any 3 consecutive even numbers, the difference between the square of the largest number and the square of the smallest number is always 8 times the middle number.

(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 Book.

The table below and the histogram in the Diagram Book give information about the distance travelled, in order to get to work, by each person working in a large store.

Distance (d km)	Frequency
$0 \leq d < 10$	40
$10 \leq d < 15$	
$15 \leq d < 20$	
$20 \leq d < 30$	
$30 \leq d < 60$	30

(continued on the next page)

Turn over

18. continued.

Using the information in the table and in the histogram in the Diagram Book,

**(a) complete the table,
(2 marks)**

**(b) complete the histogram.
(1 mark)**

(continued on the next page)

18. continued.

One of the people working in the store is chosen at random.

- (c) Work out an estimate for the probability that the distance travelled by this person, in order to get to work, was greater than 25 km
(2 marks)

(Total for Question 18 is 5 marks)

Turn over

19. Look at the diagram for Question 19 in the Diagram Book.

It is a Venn diagram which shows a universal set, \mathcal{U} and sets **A**, **B** and **C**

12, 5, 9, 10, 6, 3, 4 and **8** represent the **NUMBERS** of elements.

Find

(i) $n(A \cup B)$

(1 mark)

(continued on the next page)

19. continued.

(ii) $n(A' \cap B')$

(1 mark)

(iii) $n([A \cap B] \cup C)$

(1 mark)

(Total for Question 19 is 3 marks)

20. Given that

$$P = \frac{t - w}{y}$$

and

$t = 9.7$ correct to 1 decimal place

$w = 5.9$ correct to 1 decimal place

$y = 3$ correct to 1 significant figure

Calculate the upper bound for the value of P

Show your working clearly.

(3 marks)

Answer space continues on the next page.

20. continued.

(Total for Question 20 is 3 marks)

Turn over

21. Given that

$$x = \frac{5}{9y + 5} \text{ and that}$$

$$y = \frac{5}{5p - 2}$$

find an expression for x in terms of p

Give your expression as a single fraction in its simplest form.

(4 marks)

Answer space continues on the next page.

21. continued.

(Total for Question 21 is 4 marks)

Turn over

22. Look at the diagram for Question 22 in the Diagram Book.

You may be provided with a model.

They are NOT accurate.

They show a triangular prism **ABCDEF** with a horizontal base **ABEF**

$$AC = BC = FD = ED = 12 \text{ cm}$$

$$AB = FE = 10 \text{ cm}$$

$$BE = AF = 15 \text{ cm}$$

On the model and the diagram the line **AD** is shown.

Calculate the size of the angle between **AD** and the base **ABEF**

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

(4 marks)

Answer space continues on the next two pages.

22. continued.

22. continued.

_____ ○

(Total for Question 22 is 4 marks)

23. The sum of the first N terms of an arithmetic series, S , is 292

The 2nd term of S is 8.5

The 5th term of S is 13

Find the value of N

Show clear algebraic working.

(5 marks)

Answer space continues on the next two pages.

23. continued.

23. continued.

N = _____

(Total for Question 23 is 5 marks)

24. The functions **f** and **g** are defined as

$$f(x) = 5x^2 - 10x + 7 \quad \text{where } x \geq 1$$

$$g(x) = 7x - 6$$

(a) Find **fg(2)**

(2 marks)

(continued on the next page)

24. continued.

(b) Express the inverse function f^{-1} in the form
 $f^{-1}(x) = \dots$

(4 marks)

Answer space continues on the next page.

24. (b) continued.

$$f^{-1}(x) = \underline{\hspace{10em}}$$

(Total for Question 24 is 6 marks)

25. Look at the diagram for Question 25 in the Diagram Book.

It is NOT accurately drawn.

It shows two circles such that the region **R**, shown shaded in the diagram, is the region common to both circles.

One of the circles has centre **O** and radius 5 cm

The other circle has centre **P** and radius 4 cm

Angle **AOB** = 50°

Calculate the area of region **R**

Give your answer correct to 3 significant figures.

(6 marks)

Answer space continues on the next two pages.

25. continued.

25. continued.

_____ cm^2

(Total for Question 25 is 6 marks)

Turn over

26. Look at the diagram for Question 26 in the Diagram Book.

It is NOT accurately drawn.

OACB is a trapezium.

$$\vec{OA} = 2\underline{a}$$

$$\vec{OB} = 5\underline{b}$$

$$\vec{AC} = 3\underline{b}$$

The diagonals, **OC** and **AB**, of the trapezium intersect at the point **P**

Find and simplify an expression, in terms of **a** and **b**, for \vec{OP}

Show your working clearly.

(5 marks)

Answer space continues on the next three pages.

26. continued.

26. continued.

26. continued.

$$\vec{OP} = \underline{\hspace{10em}}$$

(Total for Question 26 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

END OF PAPER
