

Paper Reference 4MA1/1H
Pearson Edexcel
International GCSE

Total Marks

Mathematics A
Level 1/2
Paper 1H
(Calculator)
Higher Tier

Tuesday 21 May 2019 – Morning

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**

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.

ADVICE

Read each question carefully before you start to answer it.

Check your answers if you have time at the end.

Turn over

Answer ALL TWENTY FOUR questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Show that

$$4\frac{2}{3} \div 1\frac{1}{9} = 4\frac{1}{5}$$

(3 marks)

Answer space continues on the next page.

Turn over

1. continued.

(Total for Question 1 is 3 marks)

Turn over

- 2. Look at the diagram for Question 2 in the Diagram Book.**

Jalina left her home at 10 00 to cycle to a park.

On her way to the park, she stopped at a friend's house and then continued her journey to the park.

The diagram shows the distance–time graph for her journey to the park.

(continued on the next page)

2. continued.

(a) On her journey to the park, did Jalina cycle at a faster speed before or after she stopped at her friend's house?

Give a reason for your answer.

(1 mark)

(continued on the next page)

Turn over

2. continued.

Jalina stayed at the park for 45 minutes.

She then cycled, without stopping, at a constant speed of 16 km/h from the park back to her home.

(b) Show all this information on the distance–time graph.

(2 marks)

Space for working continues on the next page.

2. (b) continued.

(continued on the next page)

2. continued.

(c) Work out Jalina's average cycling speed, in kilometres per hour, for the complete journey to the park and back.

Do NOT include the times when she was not cycling in your calculation.

Give your answer correct to 1 decimal place.

(3 marks)

Answer space continues on the next two pages.

Turn over

2. (c) continued.

Turn over

2. (c) continued.

_____ km/h

(Total for Question 2 is 6 marks)

Turn over

3. (a) Simplify

$$e^9 \div e^5$$

(1 mark)

(continued on the next page)

Turn over

3. continued.

(b) Simplify

$$(x^2)^8$$

(1 mark)

(continued on the next page)

Turn over

3. continued.

(c) Expand and simplify

$$(y + 9)(y - 2)$$

(2 marks)

(continued on the next page)

Turn over

3. continued

(d) Factorise fully

$$16c^4p^2 + 20cp^3$$

(2 marks)

(Total for Question 3 is 6 marks)

Turn over

4. (a) Complete the table of values below for $y = x^2 - 3x - 1$
There are four spaces to fill.
(2 marks)

x	y
-2	
-1	
0	-1
1	
2	-3
3	
4	3

(continued on the next page)

Turn over

4. continued.

**(b) Look at the diagram for
Question 4(b) in the
Diagram Book.**

**On the grid, draw the graph of
 $y = x^2 - 3x - 1$ for all values of
 x from -2 to 4
(2 marks)**

(Total for Question 4 is 4 marks)

- 5. Look at the table for Question 5 in the Diagram Book.**

Becky has a biased 6–sided dice.

The table gives information about the probability that, when the dice is thrown, it will land on each number.

Becky is going to throw the dice 200 times.

Work out an estimate for the number of times that the dice will land on an even number.

(4 marks)

Answer space is on the next two pages.

Turn over

5. continued.

Turn over

5. continued.

(Total for Question 5 is 4 marks)

Turn over

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

It is NOT accurately drawn.

It shows a solid cuboid made from wood.

**The cuboid has length 12 cm,
width 5 cm and height 8 cm**

The wood has density 0.7 g/cm^3

Work out the mass of the cuboid.

(3 marks)

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

6. continued.

Turn over

6. continued.

_____ grams

(Total for Question 6 is 3 marks)

Turn over

7. (a) Write

5.7×10^6 as an ordinary
number.

(1 mark)

(continued on the next page)

Turn over

7. continued.

(b) Write

0·004 in standard form.

(1 mark)

(continued on the next page)

Turn over

7. continued.

(c) Work out

$$\frac{2 \times 10^4 + 3 \times 10^5}{6.4 \times 10^{-2}}$$

(2 marks)

(Total for Question 7 is 4 marks)

Turn over

- 8. On 1st January 2016 Li bought a boat for \$170 000**

The value of the boat depreciates by 8% per year.

Work out the value of the boat on 1st January 2019

Give your answer correct to the nearest dollar.

(3 marks)

Answer space continues on the next page.

8. continued.

\$ _____

(Total for Question 8 is 3 marks)

Turn over

9. Look at the diagram for Question 9 in the Diagram Book.

It is NOT accurately drawn.

It shows a shape made from a right-angled triangle and a semicircle.

AC is the diameter of the semicircle.

BA = BC = 6 cm

Angle ABC = 90°

Work out the area of the shape.

Give your answer correct to

1 decimal place.

(5 marks)

Answer space is on the next two pages.

Turn over

9. continued.

Turn over

9. continued.

_____ **cm²**

(Total for Question 9 is 5 marks)

Turn over

10. Write $8A$ as a product of powers of its prime factors when

$$A = 2^n \times 3 \times 5^m$$

(2 marks)

Answer space continues on the next page.

10. continued.

(Total for Question 10 is 2 marks)

Turn over

11.

$$C = b - a$$

$a = 6$ correct to the nearest integer

$b = 15$ correct to the nearest 5

Work out the upper bound for the value of C

Show your working clearly.

(3 marks)

Answer space continues on the next page.

Turn over

11. continued.

(Total for Question 11 is 3 marks)

Turn over

12. (a) Factorise

$$2y^2 - 7y + 6$$

(2 marks)

(continued on the next page)

Turn over

12. continued.

(b) Solve

$$\frac{4m + 9}{3} = 7 - 2m$$

Show clear algebraic working.

(4 marks)

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

Turn over

12. continued.

m = _____

(continued on the next page)

Turn over

12. continued.

(c) Write

$\frac{\sqrt[4]{x}}{x}$ in the form x^c where c is a

fraction.

(2 marks)

(Total for Question 12 is 8 marks)

Turn over

13. In group C, there are 6 girls and 8 boys.

In group D, there are 3 girls and 7 boys.

A team is made by picking at random one child from group C and one child from group D

(a) Look at the diagram for Question 13(a) in the Diagram Book.

Complete the probability tree diagram.

There are six spaces to fill.

(2 marks)

(continued on the next page)

Turn over

13. continued.

- (b) Work out the probability that
there are two boys in the team.
(2 marks)**

(continued on the next page)

Turn over

13. continued.

**After the first team has been picked,
a second team is picked.**

**One child is picked at random from
the children left in group C and one
child is picked at random from the
children left in group D**

**(c) Work out the probability that
there are two boys in each of the
two teams.**

(3 marks)

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

Turn over

13. (c) continued.

(Total for Question 13 is 7 marks)

Turn over

14. $\mathcal{E} = \{\text{positive integers less than } 20\}$

$$A = \{x : x < 12\}$$

$$B = \{x : 7 \leq x < 16\}$$

(a) List the members of $A \cap B$

(2 marks)

(continued on the next page)

Turn over

14. continued.

**C is a set such that $C \subset A$ and
 $n(C) = 3$**

**Given that all members of C are even
numbers,**

**(b) list the members of one possible
set C
(1 mark)**

(Total for Question 14 is 3 marks)

Turn over

15. Use algebra to show that the recurring decimal

$$0.2\dot{5}4\dot{4} = \frac{14}{55}$$

(2 marks)

Answer space continues on the next page.

15. continued.

(Total for Question 15 is 2 marks)

Turn over

16. Here are the first five terms of an arithmetic sequence.

7 10 13 16 19

Find the sum of the first 100 terms of this sequence.

(2 marks)

Answer space continues on the next page.

16. continued.

(Total for Question 16 is 2 marks)

Turn over

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

It is NOT accurately drawn.

A and B are two similar vases.

Vase B is larger than vase A

Vase A has height 24 cm

Vase B has height 36 cm

Vase A has a surface area of 960 cm^2

(a) Work out the surface area of vase B

(2 marks)

Answer space is on the next page.

Turn over

17. (a) continued.

_____ **cm²**

(continued on the next page)

Turn over

17. continued.

Vase B has a volume of $V \text{ cm}^3$

- (b) Find in terms of V , an expression for the volume, in cm^3 , of vase A (2 marks)**

Answer space continues on the next page.

17. (b) continued.

_____ **cm³**

(Total for Question 17 is 4 marks)

Turn over

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

It is NOT accurately drawn.

It shows triangle PQR

$$\text{PQ} = 17.8 \text{ cm}$$

$$\text{QR} = 26.3 \text{ cm}$$

$$\text{Angle PQR} = 36^\circ$$

Calculate the length of PR

Give your answer correct to 3 significant figures.

(3 marks)

Answer space continues on the next page.

18. continued.

_____ **cm**

(Total for Question 18 is 3 marks)

Turn over

- 19. Look at the diagram for Question 19 in the Diagram Book.**
It shows a grid.

The table below gives information about the heights of some trees.

Height (h metres)	Frequency
$0 < h \leq 20$	20
$20 < h \leq 35$	45
$35 < h \leq 40$	20
$40 < h \leq 50$	15

On the grid, draw a histogram for this information.

(Total for Question 19 is 3 marks)

20. Look at the diagram for Question 20 in the Diagram Book.

It is NOT accurately drawn.

A, B, C and D are points on a circle.

TDV is the tangent to the circle at D

$AB = AD$

Angle $ADT = 71^\circ$

Work out the size of angle BCD

Give a reason for each stage of your working.

(5 marks)

Answer space is on the next two pages.

Turn over

20. continued.

Turn over

20. continued.

○

(Total for Question 20 is 5 marks)

Turn over

21. Look at the diagrams for Question 21 in the Diagram Book.

They are NOT accurately drawn.

Diagram 1 shows a solid made from a hemisphere and a cylinder.

Diagram 2 shows a simplified 2D diagram of the solid.

A hemisphere is half a sphere.

The plane face of the hemisphere coincides with the upper plane face of the cylinder.

The hemisphere and the cylinder have the same radius.

(continued on the next page)

Turn over

21. continued.

The ratio of the radius of the cylinder to the height of the cylinder is 1 : 3

Given that the solid has volume $792\pi \text{ cm}^3$ work out the height of the solid.

(5 marks)

Answer space is on the next two pages.

Turn over

21. continued.

Turn over

21. continued.

_____ **cm**

(Total for Question 21 is 5 marks)

Turn over

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

The graph of $y = \sin x^\circ$ for $0 \leq x \leq 360$ is drawn on the grid.

- (a) On the grid, draw the graph of $y = 2 \sin (x + 30)^\circ$ for $0 \leq x \leq 360$**
(2 marks)

(continued on the next page)

22. continued.

(b) (i) Write

$x^2 - 6x + 10$ in the form

$(x - a)^2 + b$ where a and b

are integers.

(2 marks)

(continued on the next page)

Turn over

22. (b) continued.

- (ii) Hence, describe fully the single transformation that maps the curve with equation $y = x^2$ onto the curve with equation $y = x^2 - 6x + 10$**
- (2 marks)**
-
-
-

(Total for Question 22 is 6 marks)

23. ABCD is a kite with $AB = AD$ and $CB = CD$

B is the point with coordinates (10, 19)

D is the point with coordinates (2, 7)

Find an equation of the line AC

Give your answer in the form

$py + qx = r$ where p , q and r are integers.

(5 marks)

Answer space continues on the next two pages.

23. continued.

Turn over

23. continued.

(Total for Question 23 is 5 marks)

Turn over

24. A particle P is moving along a straight line that passes through the fixed point O

The displacement, s metres, of P from O at time t seconds is given by

$$s = t^3 - 6t^2 + 5t - 4$$

Find the value of t for which the acceleration of P is 3 m/s^2

(4 marks)

Answer space continues on the next two pages.

24. continued.

Turn over

24. continued.

t = _____

(Total for Question 24 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

END OF PAPER
