

Paper Reference 1MA1/2H
Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

Total Marks

Mathematics
Paper 2
(Calculator)
Higher Tier

Thursday 4 June 2020 – Morning

Time: 1 hour 30 minutes 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

INSTRUCTIONS

Answer ALL questions.

Answer the questions in the spaces provided in this Question Paper or on the separate diagrams – there may be more space than you need.

You must SHOW ALL YOUR WORKING.

Diagrams are NOT accurately drawn, unless otherwise indicated.

CALCULATORS MAY BE USED.

If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Turn over

INFORMATION

The total mark for this paper is 80

**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 two shapes for Question 15
You may be provided with a model for Question 18.
It is NOT accurate.**

There may be spare copies of some diagrams.

ADVICE

**Read each question carefully before you start to
answer it.**

Keep an eye on the time.

Try to answer every question.

Check your answers if you have time at the end.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1. (a) Write 84 as a product of its prime factors.
(2 marks)**

(continued on the next page)

Turn over

1. continued.

- (b) Find the lowest common multiple (LCM) of
60 and 84
(2 marks)

(Total for Question 1 is 4 marks)

Turn over

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

It shows an incomplete Venn diagram.

$$\mathcal{U} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$$

$$A = \{\text{even numbers}\}$$

$$B = \{\text{factors of } 10\}$$

- (a) Complete the Venn diagram for this information.
(3 marks)

(continued on the next page)

2. continued.

A number is chosen at random from the universal set, \mathcal{U}

(b) Find the probability that this number is in the set $A \cap B$
(2 marks)

(Total for Question 2 is 5 marks)

Turn over

3. Carlo puts tins into small boxes and into large boxes.

He puts **6** tins into each small box.

He puts **20** tins into each large box.

Carlo puts a total of **3000** tins into the boxes so that

number of tins in small boxes : number of tins in large boxes = **2 : 3**

Carlo says that less than **30%** of the boxes filled with tins are large boxes.

Is Carlo correct?

You must show all your working.

(5 marks)

Answer space continues on the next two pages.

3. continued.

3. continued.

(Total for Question 3 is 5 marks)

Turn over

4. (a) Complete the table of values for $y = 5 - x^3$ below.

There are four spaces to fill.

(2 marks)

x	y
−2	
−1	6
0	
1	
2	

(continued on the next page)

Turn over

4. continued.

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

It shows a grid.

Draw the graph of

$y = 5 - x^3$ for values of x from -2 to 2

(2 marks)

(Total for Question 4 is 4 marks)

5. Look at the diagram for Question 5 in the Diagram Book.

It shows a right-angled triangle **ABC**

Angle **ABC** is a right angle.

Angle **ACB** = 34°

AB = x mm

AC = 178 mm

Work out the value of **x**

Give your answer correct to **1** decimal place.

(2 marks)

Answer space continues on the next page.

5. continued.

(Total for Question 5 is 2 marks)

6. $\mathbf{a} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$

Find $2\mathbf{a} - 3\mathbf{b}$ as a column vector.

$$\begin{pmatrix} \\ \\ \end{pmatrix}$$

(Total for Question 6 is 2 marks)

Turn over

7. Look at the diagram for Question 7 in the Diagram Book.

It shows a right-angled triangle and a quarter circle.

The right-angled triangle **ABC** has

angle **ABC** = 90°

AC = 9 metres

AB = 6 metres

The quarter circle has centre **C** and radius **CB**

Angle **BCD** = 90°

Work out the area of the quarter circle.

Give your answer correct to 3 significant figures.

You must show all your working.

(4 marks)

Answer space continues on the next two pages.

7. continued.

7. continued.

_____ m²

(Total for Question 7 is 4 marks)

8. Tariq buys a laptop.

He gets a discount of 5% off the normal price.

Tariq pays £551 for the laptop.

(a) Work out the normal price of the laptop.

(2 marks)

£ _____

(continued on the next page)

8. continued.

Joan invests **£6000** in a savings account.

The savings account pays compound interest at a rate of

2·4% for the first year

1·7% for each extra year.

(b) Work out the value of Joan's investment at the end of **3** years.

(3 marks)

Answer space continues on the next page.

8. (b) continued.

£ _____

(Total for Question 8 is 5 marks)

Turn over

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

It shows a box plot.

Aisha recorded the heights, in centimetres, of some girls.

She used her results to work out the information in the table below.

Least height	140 cm
Lower quartile	155 cm
Interquartile range	17 cm
Median	162 cm
Range	40 cm

(continued on the next page)

9. continued.

Aisha drew the box plot in the Diagram Book for the information in the table.

The box plot is NOT fully correct.

Write down the two things Aisha should do to make the box plot fully correct.

1 _____

2 _____

(Total for Question 9 is 2 marks)

Turn over

10. (a) Simplify

$$\left(\frac{1}{m^2}\right)^0$$

(1 mark)

(b) Simplify

$$\frac{8(x-4)}{(x-4)^2}$$

(1 mark)

(continued on the next page)

Turn over

10. continued.

(c) Simplify

$$(3n^4w^2)^3$$

(2 marks)

(Total for Question 10 is 4 marks)

Turn over

11. Jack is in a restaurant.

There are 5 starters, 8 main courses and some desserts on the menu.

Jack is going to choose one starter, one main course and one dessert.

He says there are 240 ways that he can choose his starter, his main course and his dessert.

Could Jack be correct?

You must show how you get your answer.

(2 marks)

Answer space continues on the next page.

11. continued.

(Total for Question 11 is 2 marks)

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

It shows a graph which gives information about the volume, V litres, of petrol in the tank of Jim's car after it has travelled a distance of d kilometres.

- (a) Find the gradient of the graph.**
(2 marks)

(continued on the next page)

12. continued.

(b) Interpret what the gradient of the graph represents.

(1 mark)

(Total for Question 12 is 3 marks)

13. Look at the diagram for Question 13 in the Diagram Book.

It shows a triangle **ABC**

$$\text{Angle } ACB = 34^\circ$$

$$\text{Angle } ABC = 26^\circ$$

$$CB = 23.8 \text{ cm}$$

Work out the length of **AB**

Give your answer correct to **1** decimal place.

(3 marks)

Answer space continues on the next page.

13. continued.

_____ cm

(Total for Question 13 is 3 marks)

14. Look at the diagram for Question 14 in the Diagram Book.

It shows two squares, **A** and **B**

The length of each side of square **B** is 4 cm greater than the length of each side of square **A**
The area of square **B** is 70 cm^2 greater than the area of square **A**

Find the area of square **B**

Give your answer correct to 3 significant figures.

You must show all your working.

(4 marks)

Answer space continues on the next page.

14. continued.

_____ cm^2

(Total for Question 14 is 4 marks)

Turn over

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

It shows triangle **A and triangle **B** on a grid.**

Two cut out shapes may be available if you wish to use them.

Describe fully the single transformation that maps triangle **A onto triangle **B****

(Total for Question 15 is 2 marks)

16. Here are the first five terms of a quadratic sequence.

10 21 38 61 90

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

(3 marks)

Answer space continues on the next page.

16. continued.

(Total for Question 16 is 3 marks)

Turn over

17. Write down the coordinates of the turning point on the graph of
- $$y = (x + 12)^2 - 7$$

(_____ , _____)

(Total for Question 17 is 1 mark)

18. Look at the formula and at the two diagrams for Question 18 in the Diagram Book.

You may be provided with a model.

Diagram 1 and the model represent a solid cone.

Diagram 2 shows a 2D view of the cone.

The cone has a base diameter of 20 cm and a slant height of 25 cm

A circle is drawn around the surface of the cone at a slant height of 10 cm above the base.

The curved surface of the cone above the circle is shaded.

Work out the area of the curved surface of the cone that is NOT shaded.

Give your answer as a multiple of π

You must show all your working.

(4 marks)

Answer space continues on the next two pages.

18. continued.

Turn over

18. continued.

_____ cm^2

(Total for Question 18 is 4 marks)

19. A hot air balloon is descending.

The height of the balloon n minutes after it starts to descend is h_n metres.

The height of the balloon $(n + 1)$ minutes after it starts to descend, h_{n+1} metres, is given by

$$h_{n+1} = K \times h_n + 20 \quad \text{where } K \text{ is a constant.}$$

The balloon starts to descend from a height of 1200 metres at 09 15

At 09 16 the height of the balloon is 1040 metres.

Work out the height of the balloon at 09 18

(4 marks)

Answer space continues on the next two pages.

19. continued.

Turn over

19. continued.

_____ metres

(Total for Question 19 is 4 marks)

20. There are only red sweets and yellow sweets in a bag.

There are n red sweets in the bag.

There are 8 yellow sweets in the bag.

Sajid is going to take at random a sweet from the bag and eat it.

He says that the probability that the sweet will be red is $\frac{7}{10}$

(a) Show why the probability cannot be $\frac{7}{10}$
(3 marks)

(continued on the next page)

Turn over

20. continued.

After Sajid has taken the first sweet from the bag and eaten it, he is going to take at random a second sweet from the bag.

Given that the probability that both the sweets he takes will be red is $\frac{3}{5}$

(b) work out the number of red sweets in the bag.

You must show all your working.

(5 marks)

Answer space continues on the next two pages.

20. (b) continued.

Turn over

20. (b) continued.

(Total for Question 20 is 8 marks)

Turn over

21. Look at the diagram for Question 21(a) in the Diagram Book.

It shows the graph of the curve with equation $y = f(x)$ on a grid.

- (a) On the same grid, sketch the graph of the curve with equation $y = f(-x)$**
(2 marks)

(continued on the next page)

21. continued.

Look at the diagram for Question 21(b) in the Diagram Book.

The curve C with equation $y = 5 + 2x - x^2$ is transformed by a translation to give the curve S such that the point $(1, 6)$ on C is mapped to the point $(4, 6)$ on S

(b) Find an equation for S
(2 marks)

(Total for Question 21 is 4 marks)

Turn over

22. **C** is a circle with centre the origin.

A tangent to **C** passes through the points $(-20, 0)$
and $(0, 10)$

Work out an equation of **C**

You must show all your working.

(5 marks)

Answer space continues on the next two pages.

22. continued.

Turn over

22. continued.

(Total for Question 22 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

END OF PAPER
