

Paper Reference 4MA1/2H  
Pearson Edexcel  
International GCSE

Total Marks
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Mathematics A  
Paper 2H  
(Calculator)  
Higher Tier

Thursday 4 June 2020 – 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**

## **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.**

**You may be provided with models for Question 9 and  
Question 18**

## **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 ONE questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

1. (a) Simplify

$$m^6 \times m^4$$

(1 mark)

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(b) Simplify

$$k^{10} \div k^3$$

(1 mark)

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(continued on the next page)

1. continued.

(c) Simplify  
 $(3pq^4)^2$   
(2 marks)

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(continued on the next page)

Turn over

1. continued.

(d) Solve the inequality

$$4t + 7 > 2$$

(2 marks)

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(Total for Question 1 is 6 marks)

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Turn over

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

**It shows information about the lengths of time, in minutes, 120 customers spent in a supermarket.**

- (a) Write down the modal class.**  
**(1 mark)**

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**(continued on the next page)**



**2. continued.**

**(b) Work out an estimate for the mean length of time spent by the 120 customers in the supermarket.**

**(4 marks)**

\_\_\_\_\_ minutes

**(Total for Question 2 is 5 marks)**

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**Turn over**

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

It is NOT accurately drawn.

It shows a parallelogram **ABCD** and an isosceles triangle **DEF** in which **DE = DF**

**CDF** and **ADE** are straight lines.

Angle **BCD** =  $58^\circ$

Work out the size of angle **DEF**

Give a reason for each stage of your working.

(5 marks)

Answer space continues on the next page.

**3. continued.**

o

**(Total for Question 3 is 5 marks)**

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**Turn over**

4. **Andreas, Isla and Paulo share some money in the ratios  $3:2:5$**

**The TOTAL amount of money that Isla and Paulo receive is £76 more than the amount of money that Andreas receives.**

**Andreas buys a video game for £48.50 with some of his share of the money.**

**Work out how much money Andreas has left from his share of the money when he has bought the video game.**

**(4 marks)**

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

4. continued.

£ \_\_\_\_\_

(Total for Question 4 is 4 marks)

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Turn over

5. Himari's annual salary is 3 130 000 Japanese Yen (JPY)

She gets a salary increase of 4%

- (a) Work out Himari's salary after this increase.  
(3 marks)

\_\_\_\_\_ JPY

(continued on the next page)

5. continued.

Kaito bought a car.

The value of the car when Kaito bought it was  
**750 000 JPY**

At the end of each year, the value of his car had  
depreciated by **15%**

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

Give your answer correct to the nearest **JPY**  
(3 marks)

Answer space continues on the next page.

5. (b) continued.

\_\_\_\_\_ JPY

(Total for Question 5 is 6 marks)

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Turn over



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

It shows line **L** on a grid.

Find an equation for **L**

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(Total for Question 6 is 2 marks)

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Turn over

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

It is NOT accurately drawn.

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

$$AC = 3.4 \text{ cm}$$

$$CB = 4.7 \text{ cm}$$

Angle **ACB** is a right angle.

Angle **ABC** is marked  $x^\circ$

Calculate the value of **x**

Give your answer correct to one decimal place.

(3 marks)

Answer space continues on the next two pages.

7. continued.

Turn over

7. continued.

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

**(Total for Question 7 is 3 marks)**

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**Turn over**

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

It is NOT accurately drawn.

It shows an isosceles triangle **PQR**

$$PQ = PR = 8.5 \text{ cm}$$

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

Work out the area of the triangle.

(4 marks)

Answer space continues on the next page.

8. continued.

\_\_\_\_\_  $\text{cm}^2$

(Total for Question 8 is 4 marks)

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Turn over

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

You may be provided with a model.

They are NOT accurate.

They show a solid cylinder with radius 3 metres.

The volume of the cylinder is  $72\pi\text{m}^3$

Calculate the TOTAL surface area of the cylinder.

Give your answer correct to 3 significant figures.

(5 marks)

Answer space continues on the next page.

9. continued.

\_\_\_\_\_ m<sup>2</sup>

(Total for Question 9 is 5 marks)

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Turn over



10. Look at the table for Question 10 in the Diagram Book.

It shows information about the number of minutes each of **120** buses was late last Monday.

(a) Complete the cumulative frequency table below.  
(1 mark)

Number of minutes late (L)	Cumulative frequency
$0 < L \leq 10$	
$0 < L \leq 20$	
$0 < L \leq 30$	
$0 < L \leq 40$	
$0 < L \leq 50$	
$0 < L \leq 60$	

(continued on the next page)

Turn over

**10. continued.**

**(b) Look at the diagram for Question 10(b) in the Diagram Book.**

**It is a grid.**

**Draw a cumulative frequency graph for your table on the grid.**

**(2 marks)**

**(c) Use your graph to find an estimate for the interquartile range.**

**(2 marks)**

\_\_\_\_\_ minutes

**(continued on the next page)**

**10. continued.**

- (d) Use your graph to find an estimate for the number of buses that were more than 50 minutes late last Monday.**  
**(2 marks)**

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**(Total for Question 10 is 7 marks)**

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11. (a) Simplify fully

$$(8p^{15})^{\frac{2}{3}}$$

(2 marks)

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(continued on the next page)

11. continued.

(b) Express

$$\left(\frac{y}{2}\right)^{-4} \text{ in the form } ay^n$$

where **a** and **n** are integers.

(2 marks)

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(continued on the next page)

11. continued.

(c) Solve

$$\frac{4x - 2}{3} - \frac{5 - 3x}{4} = 6$$

Show clear algebraic working.

(4 marks)

Answer space continues on the next page.

11. (c) continued.

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

(Total for Question 11 is 8 marks)

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Turn over

12. Given that

$$\frac{3^x}{9^{3x}} = 81$$

find the value of  $x$

Show clear algebraic working.

$x =$  \_\_\_\_\_

(Total for Question 12 is 3 marks)

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Turn over



13. Use algebra to show that

$$0.6\overline{81} = \frac{15}{22}$$

(2 marks)

Answer space continues on the next page.

**13. continued.**

**(Total for Question 13 is 2 marks)**

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14.  $\mathcal{E} = \{\text{integers } x \text{ such that } 10 \leq x \leq 25\}$

$$A = \{x : x < 18\}$$

$$B = \{x : 13 \leq x < 22\}$$

(a) Write down  $n(A)$

(1 mark)

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(b) List the members of the set  $(A \cup B)'$

(2 marks)

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(continued on the next page)

Turn over

14. continued.

Remember:

$$\mathcal{E} = \{\text{integers } x \text{ such that } 10 \leq x \leq 25\}$$

$$A = \{x : x < 18\}$$

$$B = \{x : 13 \leq x < 22\}$$

- (c) List the members of the set  $A' \cap B$   
(2 marks)

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(continued on the next page)

14. continued.

Remember:

$$\mathcal{E} = \{\text{integers } x \text{ such that } 10 \leq x \leq 25\}$$

$$A = \{x : x < 18\}$$

$$B = \{x : 13 \leq x < 22\}$$

Given that

$$C \subset A, C \subset B \text{ and } n(C) = 5$$

- (d) List the members of the set  $C$   
(1 mark)

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(Total for Question 14 is 6 marks)

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Turn over

15. Make  $y$  the subject of

$$x = \frac{5 - 2y}{y + 3}$$

(4 marks)

Answer space continues on the next page.

15. continued.

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(Total for Question 15 is 4 marks)

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Turn over

**16. Solve the simultaneous equations**

$$3xy - y^2 = 8$$

$$x - 2y = 1$$

**Show clear algebraic working.**

**(5 marks)**

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



16. continued.

Turn over

**16. continued.**

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**(Total for Question 16 is 5 marks)**

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**Turn over**

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

It is NOT accurately drawn.

It shows a rectangle PQRS

$$PQ = (2y - 4) \text{ cm}$$

$$PS = (3y + 2) \text{ cm}$$

The area of the rectangle is  $A \text{ cm}^2$

Given that  $A < 3y + 27$

find the range of possible values for  $y$

(5 marks)

Answer space continues on the next page.

17. continued.

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(Total for Question 17 is 5 marks)

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Turn over

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

You may be provided with a model.

They are NOT accurate.

They show cuboid **ABCDEFGH**

**$AB = 5 \text{ cm}$**

**$AH = 4 \text{ cm}$**

The size of the angle between **CH** and the plane **ABCD** is  **$35^\circ$**

Calculate the volume of the cuboid.

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

(5 marks)

Answer space continues on the next page.

18. continued.

\_\_\_\_\_  $\text{cm}^3$

(Total for Question 18 is 5 marks)

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Turn over

19. **OAB** is a triangle.

$$\overrightarrow{OA} = \underline{a} \qquad \overrightarrow{OB} = \underline{b}$$

The point **C** lies on **OA** such that **OC : CA = 1 : 2**

The point **D** lies on **OB** such that **OD : DB = 1 : 2**

Using a vector method, prove that **ABDC** is a trapezium.

(3 marks)

Answer space continues on the next page.

19. continued.

(Total for Question 19 is 3 marks)

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Turn over



20. A bag contains  $X$  counters.

There are only red counters and blue counters in the bag.

There are 4 more blue counters than red counters in the bag.

Finty takes at random 2 counters from the bag.

The probability that Finty takes 2 blue counters from the bag is  $\frac{3}{8}$

Work out the value of  $X$

Show clear algebraic working.

(5 marks)

Answer space continues on the next two pages.

20. continued.

Turn over

**20. continued.**

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**(Total for Question 20 is 5 marks)**

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**Turn over**

21. The function  $f$  is such that

$$f(x) = 5 + 6x - x^2 \quad \text{for } x \leq 3$$

- (a) Express  $5 + 6x - x^2$   
in the form  $p - (x - q)^2$   
where  $p$  and  $q$  are constants.  
(2 marks)

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(continued on the next page)

**21. continued.**

- (b) Using your answer to part (a), find the range of values of  $x$  for which  $f^{-1}(x)$  is positive.**

**(5 marks)**

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

**21. (b) continued.**

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**(Total for Question 21 is 7 marks)**

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**TOTAL FOR PAPER IS 100 MARKS**

**END OF PAPER**

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