

**Paper Reference 4MA1/2H  
Pearson Edexcel  
International GCSE**

Total Marks
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# **Mathematics A**

**Level 1/2**

**Paper 2H**

**(Calculator)**

**Higher Tier**

**Thursday 6 June 2019 – Morning**

**Time: 2 hours plus your additional time allowance.**

**In the boxes below, write your name, centre number and candidate number.**

<b>Surname</b>					
<b>Other names</b>					
<b>Centre Number</b>					
<b>Candidate Number</b>					

**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.

You may be provided with models for Questions 18 and 21

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.

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**Answer ALL TWENTY FOUR questions.**

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

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

1. Look at the table for Question 1 in the Diagram Book.

It shows information about the heights, in **cm**, of **48** sunflowers in a garden centre.

Work out an estimate for the mean height of the sunflowers.

\_\_\_\_\_ **cm**

**(Total for Question 1 is 4 marks)**

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

Use ruler and compasses to construct the perpendicular bisector of the line **DE**

You must show all your construction lines.

(Total for Question 2 is 2 marks)

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

$$A = \{2, 3, 5, 7\}$$

$$B = \{4, 6, 8, 10\}$$

(a) Explain why  $A \cap B = \emptyset$

(1 mark)

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(continued on the next page)

3. continued.

$$x \in \mathcal{E} \text{ and } x \notin A \cup B$$

(b) Write down the TWO possible values of  $x$   
(1 mark)

\_\_\_\_\_ , \_\_\_\_\_

(continued on the next page)

3. continued.

Set **C** is such that

$$A \cup B \cup C = \mathcal{E}$$

$$A \cap C = \{2\}$$

$$B \cap C' = \{4, 6, 10\}$$

(c) List all the members of set **C**

(2 marks)

Answer space continues on the next page.

3. (c) continued.

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**(Total for Question 3 is 4 marks)**

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4. A cylinder has diameter **14 cm** and height **20 cm**

Work out the volume of the cylinder.

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

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

(Total for Question 4 is 2 marks)

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5. Josh buys and sells books for a living.

He buys 120 books for £4 each.

He sells  $\frac{1}{2}$  of the books for £5 each.

He sells 40% of the books for £7 each.

He sells the rest of the books for £8 each.

(a) Calculate Josh's percentage profit.

(5 marks)

Answer space continues on the next page.

5. (a) continued.

\_\_\_\_\_ %

(continued on the next page)

5. continued.

One book that Josh owns had a value of **£15** on the **1st May 2019**

The value of this book had increased by **20%** in the last year.

(b) Find the value of the book on the **1st May 2018**  
(3 marks)

£ \_\_\_\_\_

(Total for Question 5 is 8 marks)

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

It is NOT accurately drawn.

**ABC** and **DEF** are similar triangles.

In triangle **ABC**,

$$AB = 6 \text{ cm}$$

$$AC = 4.2 \text{ cm}$$

In triangle **DEF**,

$$DE = 15 \text{ cm}$$

$$EF = 19.5 \text{ cm}$$

$$\text{Angle } ABC = \text{Angle } DEF$$

$$\text{Angle } BAC = \text{Angle } EDF$$

(continued on the next page)

6. continued.

- (a) Work out the length of **DF**  
(2 marks)

\_\_\_\_\_ cm

(continued on the next page)

6. continued.

(b) Work out the length of **BC**  
(2 marks)

\_\_\_\_\_ cm

(Total for Question 6 is 4 marks)

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7. **30** students in a class sat a Mathematics test.  
The mean mark in the test for the **30** students was **26.8**

**13** of the **30** students in the class are boys.  
The mean mark in the test for the boys was **25**

Find the mean mark in the test for the girls.  
Give your answer correct to **3** significant figures.  
(3 marks)

Answer space continues on the next page.

7. continued.

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

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8. Change a speed of  $X$  kilometres per hour into a speed in metres per second.  
Simplify your answer.

\_\_\_\_\_ m/s

(Total for Question 8 is 3 marks)

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9. Solve the simultaneous equations

$$x + 2y = -0.5$$

$$3x - y = 16$$

Show clear algebraic working.

(3 marks)

Answer space continues on the next page.

9. continued.

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

**y** = \_\_\_\_\_

(Total for Question 9 is 3 marks)

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10. The straight line **L** has gradient **5** and passes through the point with coordinates **(0, -3)**

(a) Write down an equation for **L**  
(2 marks)

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(continued on the next page)

10. continued.

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

The region  $R$ , shown shaded in the diagram, is bounded by four straight lines.

Write down the inequalities that define  $R$   
(2 marks)

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(Total for Question 10 is 4 marks)

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**11. Look at the table for Question 11 in the Diagram Book.**

**It gives the average crowd attendance per match for each of five football clubs for one season.**

**(a) Find the difference between the average crowd attendance for Barcelona and the average crowd attendance for Monaco.**

**Give your answer in standard form.**

**(2 marks)**

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**(continued on the next page)**

11. continued.

Antonio says,

“The average crowd attendance for Chelsea is approximately **50** times that for Oxford United.”

(b) Is Antonio correct?

You must give a reason for your answer.

(2 marks)

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(continued on the next page)

11. continued.

During last season the cost of a ticket to watch Seapron United increased by 15% and then decreased by 8%

(c) Work out the overall percentage change in the cost of a ticket to watch Seapron United during last season.

(2 marks)

\_\_\_\_\_ %

(Total for Question 11 is 6 marks)

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

It is NOT accurately drawn.

**ABCD** is a trapezium.

$$AB = 16.7 \text{ cm}$$

$$BC = 21.2 \text{ cm}$$

$$\text{Angle } ADC = 43^\circ$$

Angles **DAB** and **ABC** are right angles.

Calculate the perimeter of the trapezium.

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

(4 marks)

Answer space continues on the next page.

12. continued.

\_\_\_\_\_ cm

(Total for Question 12 is 4 marks)

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Turn over

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

It gives information about the times taken, in minutes, for 80 taxi journeys.

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

Time taken ( $t$ minutes)	Cumulative frequency
$0 < t \leq 5$	
$0 < t \leq 10$	
$0 < t \leq 15$	
$0 < t \leq 20$	
$0 < t \leq 25$	
$0 < t \leq 30$	

(continued on the next page)

**13. continued.**

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

**On the grid, draw a cumulative frequency graph for your table.**

**(2 marks)**

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

**(1 mark)**

\_\_\_\_\_ minutes

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

**(2 marks)**

\_\_\_\_\_ minutes

**(Total for Question 13 is 6 marks)**

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**Turn over**

14. Here are two vectors.

$$\vec{AB} = \begin{pmatrix} 6 \\ -9 \end{pmatrix} \quad \vec{CB} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$$

Find the magnitude of  $\vec{AC}$

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(Total for Question 14 is 3 marks)

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15. Make  $x$  the subject of the formula

$$y = \sqrt{\frac{3x - 2}{x + 1}}$$

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(Total for Question 15 is 4 marks)

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Turn over

16. Show that

$$\frac{4 + \sqrt{8}}{\sqrt{2} - 1}$$

can be written in the form  $a + b\sqrt{2}$ , where  $a$  and  $b$  are integers.

Show each stage of your working clearly and give the value of  $a$  and the value of  $b$   
(3 marks)

Answer space continues on the next page.

16. continued.

**(Total for Question 16 is 3 marks)**

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**Turn over**

17.  $y$  is directly proportional to the cube of  $x$

$$y = 20h \text{ when } x = h \quad (h \neq 0)$$

(a) Find a formula for  $y$  in terms of  $x$  and  $h$   
(3 marks)

$$y = \underline{\hspace{10cm}}$$

(continued on the next page)

17. continued.

(b) Find  $x$  in terms of  $h$  when  $y = 67.5h$

Give your answer in its simplest form.

(2 marks)

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

(Total for Question 17 is 5 marks)

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

You may be provided with a model.

They are NOT accurate.

The diagram and model show a solid cuboid **PQRSTU VW**

$$PQ = QR = x \text{ cm}$$

$$TP = (12 - 3x) \text{ cm}$$

The total surface area of the cuboid is  $A \text{ cm}^2$

Find the maximum value of  $A$

(5 marks)

Answer space continues on the next page.

18. continued.

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(Total for Question 18 is 5 marks)

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Turn over

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

It is NOT accurately drawn.

**ABCD** is a quadrilateral.

$$AD = 26 \text{ cm}$$

$$\text{Angle } ABC = 95^\circ$$

$$\text{Angle } ACB = 47^\circ$$

$$\text{Angle } CAD = 39^\circ$$

The area of triangle **ACD** is  $250 \text{ cm}^2$

Calculate the area of the quadrilateral **ABCD**

Show your working clearly.

Give your answer correct to 3 significant figures.

(6 marks)

Answer space continues on the next two pages.

19. continued.

19. continued.

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

(Total for Question 19 is 6 marks)

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Turn over

20. The equation of the line **L** is

$$y = 9 - x$$

The equation of the curve **C** is

$$x^2 - 3xy + 2y^2 = 0$$

**L** and **C** intersect at two points.

Find the coordinates of these two points.

Show clear algebraic working.

(5 marks)

Answer space continues on the next two pages.

20. continued.

20. continued.

( \_\_\_\_\_ , \_\_\_\_\_ )

and

( \_\_\_\_\_ , \_\_\_\_\_ )

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

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

You may be provided with a model.

They are NOT accurate.

Diagram 1 and the model show cuboid

**ABCDEFGH**

For this cuboid

the length of **AB** : the length of **BC** : the length of **CF** = **4 : 2 : 3**

Diagram 1a shows the triangle **ABC**

Diagram 1b shows the triangle **ACF**

Calculate the size of the angle between **AF** and the plane **ABCD**

Give your answer correct to one decimal place.

(3 marks)

Answer space continues on the next page.

21. continued.

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(Total for Question 21 is 3 marks)

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Turn over

22. Simplify fully

$$\frac{6x^3 + 13x^2 - 5x}{4x^2 - 25}$$

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(Total for Question 22 is 3 marks)

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Turn over

23. Boris has a bag that only contains red sweets and green sweets.

Boris takes at random 2 sweets from the bag.

The probability that Boris takes exactly 1 red sweet from the bag is  $\frac{12}{35}$

Originally there were 3 red sweets in the bag.

Work out how many green sweets there were originally in the bag.

Show your working clearly.

(5 marks)

Answer space continues on the next two pages.

23. continued.

23. continued.

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**(Total for Question 23 is 5 marks)**

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24. The function  $f$  is such that

$$f(x) = 3x - 2$$

(a) Find  $f(5)$

(1 mark)

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(continued on the next page)

24. continued.

The function  $g$  is such that

$$g(x) = 2x^2 - 20x + 9 \quad \text{where } x \geq 5$$

(b) Express the inverse function  $g^{-1}$  in the form

$$g^{-1}(x) = \dots$$

(4 marks)

Answer space continues on the next page.

24. (b) continued.

$$g^{-1}(x) = \underline{\hspace{15em}}$$

(Total for Question 24 is 5 marks)

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**TOTAL FOR PAPER IS 100 MARKS**

**END OF PAPER**

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