

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

<b>Total Marks</b>
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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**

**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.**

**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.**

**5**

**Answer ALL TWENTY FOUR questions.**

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

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

**Turn over**

- 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.**

**(4 marks)**

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

**1. continued.**

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

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

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**Turn over**

**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)**

**Turn over**

**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.**

**Turn over**

**3. (c) continued.**

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

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**Turn over**

- 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.**

**(2 marks)**

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

**4. continued.**

\_\_\_\_\_ **cm<sup>3</sup>**

**(Total for Question 4 is 2 marks)**

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**Turn over**

- 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 is on the next two pages.**

**5. (a) continued.**

**Turn over**



**5. (a) continued.**

\_\_\_\_\_ %

**(continued on the next page)**

**Turn over**

**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)**

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

**Turn over**

**5. (b) continued.**

**£** \_\_\_\_\_

**(Total for Question 5 is 8 marks)**

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**Turn over**

**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,**

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

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

**In triangle DEF,**

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

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

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

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

**(continued on the next page)**

**Turn over**

**6. continued.**

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

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

**(continued on the next page)**

**Turn over**

**6. continued.**

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

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

**(Total for Question 6 is 4 marks)**

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**Turn over**

**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 is on the next page.**

**Turn over**

**7. continued.**

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

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**Turn over**



- 8. Change a speed of  $X$  kilometres per hour into a speed in metres per second.**

**Simplify your answer.**

**(3 marks)**

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

**8. continued.**

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

**(Total for Question 8 is 3 marks)**

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**Turn over**

**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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**Turn over**

**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)**

**Write your answer in the space below and on the lines on the next page.**

**Turn over**

**10. (b) continued.**

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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)**

**Turn over**



**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)**

**Write your answer in the space below and on the lines on the next page.**

**Turn over**

11. (b) continued.

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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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**Turn over**

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

**It is NOT accurately drawn.**

**ABCD is a trapezium.**

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

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

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

**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 is on the next two pages.**

**Turn over**

**12. continued.**

**Turn over**

**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 on the following page.**

**(1 mark)**

13. (a) continued.

<b>Time taken (t minutes)</b>	<b>Cumulative frequency</b>
<b><math>0 &lt; t \leq 5</math></b>	
<b><math>0 &lt; t \leq 10</math></b>	
<b><math>0 &lt; t \leq 15</math></b>	
<b><math>0 &lt; t \leq 20</math></b>	
<b><math>0 &lt; t \leq 25</math></b>	
<b><math>0 &lt; t \leq 30</math></b>	

(continued on the next page)

Turn over



**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**

**(continued on the next page)**

**Turn over**

**13. continued.**

**(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.**

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

**Find the magnitude of  $\overrightarrow{AC}$**

**(3 marks)**

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

**14. continued.**

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**(Total for Question 14 is 3 marks)**

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**Turn over**

**15. Make  $x$  the subject of the formula**

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

**(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. 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  
two pages.**

**16. continued.**

**Turn over**



**16. continued.**

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

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**Turn over**

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

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

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

**(3 marks)**

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

**17. (a) continued.**

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

**(continued on the next page)**

**Turn over**

**17. continued.**

**(b) Find  $x$  in terms of  $h$  when**

$$y = 67.5h$$

**Give your answer in its simplest form.**

**(2 marks)**

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

**17. (b) continued.**

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

**(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.**

**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 is on the next two pages.**

**Turn over**

18. continued.

Turn over

**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.**

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

**Angle  $ABC = 95^\circ$**

**Angle  $ACB = 47^\circ$**

**Angle  $CAD = 39^\circ$**

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

**(continued on the next page)**

**19. continued.**

**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.**

**Turn over**

**19. continued.**

\_\_\_\_\_ **cm<sup>2</sup>**

**(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 three pages.**

**20. continued.**

**Turn over**

**20. continued.**

**Turn over**

**20. continued.**

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

**and**

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

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

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**Turn over**



**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  $ACF$**

**(continued on the next page)**

**Turn over**

**21. continued.**

**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.**

**Turn over**

**21. continued.**

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**(Total for Question 21 is 3 marks)**

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**Turn over**

**22. Simplify fully**

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

**(3 marks)**

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

**22. continued.**

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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.**

**(continued on the next page)**

**23. continued.**

**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.**

**Turn over**



**23. continued.**

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

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**Turn over**

**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**

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

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

**(4 marks)**

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

**24. (b) continued.**

**Turn over**

**24. (b) continued.**

$$g^{-1}(x) = \underline{\hspace{10cm}}$$

**(Total for Question 24 is 5 marks)**

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**TOTAL FOR PAPER IS 100 MARKS**

**END OF PAPER**

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