

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

<b>Total Marks</b>
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**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.**

<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**

**Turn over**

# **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  $\pi$  button, take the value of  $\pi$  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.**

**Turn over**

**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.**

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**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)

Answer space continues on the next page.

**1. (a) continued.**

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**(continued on the next page)**

**Turn over**



**1. continued.**

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

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

**1. (b) continued.**

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

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

**It shows an incomplete Venn diagram.**

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

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

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

- (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)**

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

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**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.**

**(continued on the next page)**

**Turn over**

**3. continued.**

**Is Carlo correct?**

**You must show all your working.**

**(5 marks)**

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

**3. continued.**

**Turn over**

**3. continued.**

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

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**Turn over**



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

There are four spaces to fill.

(2 marks)

<b>x</b>	<b>y</b>
<b>−2</b>	
<b>−1</b>	<b>6</b>
<b>0</b>	
<b>1</b>	
<b>2</b>	

(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)**

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- 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 =  $34^\circ$**

**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.**

**Turn over**

**5. continued.**

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

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**Turn over**

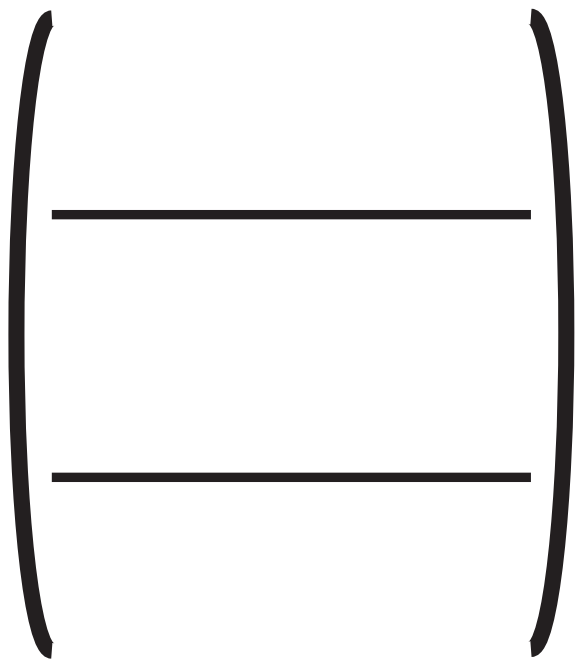
6.  $\mathbf{a} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$        $\mathbf{b} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$

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

**(2 marks)**

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

**6. continued.**



**(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 shows a right-angled triangle and a quarter circle.**

**The right-angled triangle ABC has angle  $ABC = 90^\circ$**

**$AC = 9$  metres**

**$AB = 6$  metres**

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

**Angle  $BCD = 90^\circ$**

**(continued on the next page)**

**7. continued.**

**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.**

**Turn over**

**7. continued.**

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

**(Total for Question 7 is 4 marks)**

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**Turn over**

**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)**

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

8. (a) continued.

£ \_\_\_\_\_

(continued on the next page)

Turn over

**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 two pages.**

**Turn over**

8. (b) continued.

Turn over

**8. (b) continued.**

£ \_\_\_\_\_

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

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**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.**

<b>Least height</b>	<b>140 cm</b>
<b>Lower quartile</b>	<b>155 cm</b>
<b>Interquartile range</b>	<b>17 cm</b>
<b>Median</b>	<b>162 cm</b>
<b>Range</b>	<b>40 cm</b>

**(continued on the next page)**

**Turn over**



**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.**

**(2 marks)**

**Answer lines continue on the next page.**

**1** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Turn over**

9. continued.

2 \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**(Total for Question 9 is 2 marks)**

\_\_\_\_\_

**10. (a) Simplify**

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

**(1 mark)**

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**(continued on the next page)**

**Turn over**

**10. continued.**

**(b) Simplify**

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

**(1 mark)**

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**(continued on the next page)**

**Turn over**

**10. continued.**

**(c) Simplify**

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

**(2 marks)**

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**(Total for Question 10 is 4 marks)**

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**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 is on the next page.**

**11. continued.**

**(Total for Question 11 is 2 marks)**

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**Turn over**

**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.**

**(continued on the next page)**



**12. continued.**

**(a) Find the gradient of the graph.**

**(2 marks)**

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**(continued on the next page)**

**Turn over**

**12. continued.**

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

**(1 mark)**

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**(Total for Question 12 is 3 marks)**

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**Turn over**

**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 two pages.**

**Turn over**

**13. continued.**

**Turn over**

**13. continued.**

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

**(Total for Question 13 is 3 marks)**

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**Turn over**

**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  $70 \text{ cm}^2$  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 is on the next two pages.**

**Turn over**

**14. continued.**

**Turn over**

**14. continued.**

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

**(Total for Question 14 is 4 marks)**

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**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****

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**(Total for Question 15 is 2 marks)**

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- 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.**

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

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**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)**

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**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**

**(continued on the next page)**

**18. continued.**

**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  $\pi$**

**You must show all your working.**

**(4 marks)**

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

**Turn over**

18. continued.

Turn over

**18. continued.**

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

**(Total for Question 18 is 4 marks)**

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**Turn over**



**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**

$$h_{n+1} = K \times h_n + 20$$

**where  $K$  is a constant.**

**(continued on the next page)**

**19. continued.**

**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)**

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**Turn over**

**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)**

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

**Turn over**

**20. (a) continued.**

**(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 is on the next three pages.**

**Turn over**

**20. (b) continued.**

**Turn over**



**20. (b) continued.**

**Turn over**

**20. (b) continued.**

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**(Total for Question 20 is 8 marks)**

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**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)**

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

**Turn over**

**21. (b) continued.**

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**(Total for Question 21 is 4 marks)**

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**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 three pages.**

**22. continued.**

**Turn over**

**22. continued.**

**Turn over**



**22. continued.**

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**(Total for Question 22 is 5 marks)**

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**TOTAL FOR PAPER IS 80 MARKS**

**END OF PAPER**

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