

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

<b>Total Marks</b>
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**Mathematics**  
**PAPER 1 (Non-Calculator)**  
**Higher Tier**

**Time: 1 hour 30 minutes**

**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, Formulae Sheet (enclosed). Tracing paper may be used.**

**YOU WILL BE GIVEN**

**Diagram Booklet**

**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 NOT BE USED.**

**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.**

**There may be spare copies of some diagrams in case you need to use them.**

**You may be provided with a model for Question 9  
It is NOT accurate.**

**Turn over**

**ADVICE**

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

**Try to answer every question.**

**Check your answers if you have time at the end.**

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**Turn over**

**Answer ALL questions.**

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

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

**Turn over**

7

1. Solve

$$7x - 27 < 8$$

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**(Total for Question 1 is 2 marks)**

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**Turn over**

- 2. Write 124 as a product of its prime factors.**

**(2 marks)**

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



**2. continued.**

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

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**Turn over**

3. A delivery company has a total of **160** cars and vans.

the number of cars : the number of vans = **3 : 7**

Each car and each van uses electricity or diesel or petrol.

$\frac{1}{8}$  of the cars use electricity.

**25%** of the cars use diesel.

The rest of the cars use petrol.

(continued on the next page)

**3. continued.**

**Work out the number of cars that use petrol.**

**You must show all your working.**

**(5 marks)**

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

**3. continued.**

**Turn over**

**3. continued.**

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

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**Turn over**

4. (a) Write

$1.63 \times 10^{-3}$  as an ordinary  
number.

(1 mark)

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(continued on the next page)

Turn over

**4. continued.**

**(b) Write**

**438 000 in standard form.**

**(1 mark)**

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**(continued on the next page)**

**Turn over**

**4. continued.**

**(c) Work out**

$$\left(4 \times 10^3\right) \times \left(6 \times 10^{-5}\right)$$

**Give your answer in standard form.**

**(2 marks)**

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

**Turn over**



**4. (c) continued.**

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

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**Turn over**

- 5. Look at the diagram for Question 5 in the Diagram Booklet.**

**It shows a regular hexagon and a regular pentagon which share a common side.**

**Work out the size of the angle marked X**

**You must show all your working.**

**(3 marks)**

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

**5. continued.**

**Turn over**

**5. continued.**

○

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

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**Turn over**

6. (a) Complete the table of values

below for

$$y = x^2 - 3x + 1$$

There are four spaces to fill.

(2 marks)

Space for working is on the next page.

x	y
-1	
0	1
1	-1
2	
3	
4	

Turn over

**6. (a) continued.**

**(continued on the next page)**

**Turn over**

**6. continued.**

**(b) Look at the diagram  
for Question 6(b) in the  
Diagram Booklet.**

**It shows a grid.**

**On the grid, draw the graph of  
 $y = x^2 - 3x + 1$  for values of  $x$   
from  $-1$  to  $4$**

**(2 marks)**

**(continued on the next page)**

**Turn over**

**6. continued.**

**(c) Using your graph, find estimates for the solutions of the equation  $x^2 - 3x + 1 = 0$**

**(2 marks)**

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

**Turn over**



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

It shows cube **A** and cube **B**

Cube **A** has sides of length 3 cm

Cube **B** has sides of length 4 cm

Cube **A** has a mass of 81 grams.

Cube **B** has a mass of 128 grams.

Work out

the density of cube **A** : the density of  
cube **B**

(continued on the next page)

Turn over

**7. continued.**

**Give your answer in the form  $a : b$ ,  
where  $a$  and  $b$  are integers.**

**(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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**Turn over**

- 8. Look at the table for Question 8 in the Diagram Booklet.**

**It shows the amount of snow, in cm, that fell each day for 30 days.**

**Work out an estimate for the mean amount of snow per day.**

**(3 marks)**

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

8. continued.

Turn over

8. continued.

\_\_\_\_\_ cm

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

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**Turn over**

- 9. Look at the diagram for Question 9 in the Diagram Booklet.**

**You may be provided with a model.**

**A cube is placed on top of a cuboid to form a solid, as shown by the diagram and the model.**

**The cube has edges of length 4 cm**

**The cuboid has dimensions 7 cm by 6 cm by 5 cm**

**Work out the total surface area of the solid.**

**(3 marks)**

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

**Turn over**

**9. continued.**

**Turn over**



**9. continued.**

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

**(Total for Question 9 is 3 marks)**

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**Turn over**

**10. Look at the table for Question 10 in the Diagram Booklet.**

**It shows some information about the profit made each day at a cricket club on 100 days.**

**(continued on the next page)**

10. continued.

(a) Complete the cumulative frequency table below.

There are six spaces to fill.

(1 mark)

<b>Profit (£x)</b>	<b>Cumulative frequency</b>
<b><math>0 \leq x &lt; 50</math></b>	
<b><math>0 \leq x &lt; 100</math></b>	
<b><math>0 \leq x &lt; 150</math></b>	
<b><math>0 \leq x &lt; 200</math></b>	
<b><math>0 \leq x &lt; 250</math></b>	
<b><math>0 \leq x &lt; 300</math></b>	

(continued on the next page)

Turn over

**10. continued.**

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

**It shows a grid.**

**On the grid, draw a cumulative  
frequency graph for this  
information.**

**(2 marks)**

**(continued on the next page)**

**Turn over**

**10. continued.**

**(c) Use your graph to find an estimate for the number of days on which the profit was less than £125**

**(1 mark)**

\_\_\_\_\_ days

**(continued on the next page)**

**Turn over**

**10. continued.**

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

**(2 marks)**

**£ \_\_\_\_\_**

**(Total for Question 10 is 6 marks)**

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**Turn over**

- 11. Look at the information for Question 11 in the Diagram Booklet.**
- Cormac has some sweets in a bag.**
- The sweets are lime flavoured or strawberry flavoured or orange flavoured.**

**Cormac is going to take at random a sweet from the bag.**

**The probability that he takes a lime flavoured sweet is  $\frac{3}{7}$**

**Work out the value of  $x$**

**(3 marks)**

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

**Turn over**

**11. continued.**

**Turn over**



**11. continued.**

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

**(Total for Question 11 is 3 marks)**

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**Turn over**

**12. Express**

**$0.\dot{1}\dot{1}\dot{7}$  as a fraction.**

**You must show all your working.**

**(3 marks)**

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

**Turn over**

**12. continued.**

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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 Booklet.

A right-angled triangle is formed by the diameters of three semicircular shaded regions, **A**, **B** and **C** as shown in the diagram.

Show that

area of region **A** =  
area of region **B** + area of region **C**

(3 marks)

Answer space continues on the next two pages.

Turn over

**13. continued.**

**Turn over**

**13. continued.**

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

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**Turn over**

**14. Look at the diagram for Question 14 in the Diagram Booklet.**

**It shows a speed–time graph.**

- (a) Work out an estimate of the gradient of the graph at  $t = 2$   
(3 marks)**

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

14. (a) continued.

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(continued on the next page)

Turn over



**14. continued.**

**(b) What does the area under the  
graph represent?**

**(1 mark)**

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

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**Turn over**

15. **A, B and C** are three points such that

$$\overrightarrow{AB} = 3a + 4b$$

$$\overrightarrow{AC} = 15a + 20b$$

(a) Prove that **A, B and C** lie on a straight line.

(2 marks)

Answer space continues on the next page.

Turn over

**15. (a) continued.**

**(continued on the next page)**

**Turn over**

15. continued.

**D, E and F** are three points on a straight line such that

$$\overrightarrow{DE} = 3e + 6f$$

$$\overrightarrow{EF} = -10 \cdot 5e - 21f$$

(b) Find the ratio

length of **DF** : length of **DE**

(3 marks)

Answer space continues on the next two pages.

Turn over

**15. (b) continued.**

**Turn over**

15. (b) continued.

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**(Total for Question 15 is 5 marks)**

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**Turn over**

- 16. A first aid test has two parts, a theory test and a practical test.**

**The probability of passing the theory test is  $0.75$**

**The probability of passing only one of the two parts is  $0.36$**

**The two events are independent.**

**Work out the probability of passing the practical test.**

**(4 marks)**

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

16. continued.

Turn over



**16. continued.**

**Turn over**

**16. continued.**

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**(Total for Question 16 is 4 marks)**

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**Turn over**

17.  $y$  is directly proportional to the square root of  $t$

$$y = 15 \text{ when } t = 9$$

$t$  is inversely proportional to the cube of  $x$

$$t = 8 \text{ when } x = 2$$

Find a formula for  $y$  in terms of  $x$

Give your answer in its simplest form.

(4 marks)

Answer space continues on the next two pages.

**17. continued.**

**Turn over**

**17. continued.**

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**(Total for Question 17 is 4 marks)**

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**Turn over**

18. Work out the value of

$$\frac{\left(5\frac{4}{9}\right)^{-\frac{1}{2}} \times \left(4\frac{2}{3}\right)}{2^{-3}}$$

You must show all your working.

(4 marks)

Answer space continues on the next two pages.

Turn over

18. continued.

Turn over

**18. continued.**

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

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**Turn over**



19. Solve

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

Give your answer in the form

$\frac{p \pm \sqrt{q}}{2}$  where  $p$  and  $q$  are integers.

(4 marks)

Answer space continues on the next three pages.

Turn over

**19. continued.**

**Turn over**

**19. continued.**

**Turn over**

**19. continued.**

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**(Total for Question 19 is 4 marks)**

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**Turn over**

20. The centre of a circle is the point with coordinates  $(-1, 3)$

The point **A** with coordinates  $(6, 8)$  lies on the circle.

Find an equation of the tangent to the circle at **A**

Give your answer in the form

$ax + by + c = 0$  where  $a$ ,  $b$  and  $c$  are integers.

(4 marks)

Answer space continues on the next three pages.

**20. continued.**

**Turn over**

**20. continued.**

**Turn over**

**20. continued.**

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**(Total for Question 20 is 4 marks)**

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**Turn over**



**21. Look at the diagram for Question 21 in the Diagram Booklet.**

**It shows three circles, each of radius 4 cm**

**The centres of the circles are A, B and C such that ABC is a straight line and  $AB = BC = 4$  cm**

**Work out the total area of the two shaded regions.**

**Give your answer in terms of  $\pi$   
(5 marks)**

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

**Turn over**

**21. continued.**

**Turn over**

**21. continued.**

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

**(Total for Question 21 is 5 marks)**

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**TOTAL FOR PAPER IS 80 MARKS**

**END OF PAPER**

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