

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

Total Marks
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Mathematics  
PAPER 1  
(Non–Calculator)  
Higher Tier

Time: 1 hour 30 minutes 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. Tracing paper may be used.**

**YOU WILL BE GIVEN**

**Diagram Booklet**

**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.**

## **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 models for Question 6 and  
Question 7  
They are NOT accurate.**

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

## **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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**Answer ALL questions.**

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

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

1. (a) Work out

$$3.67 \times 4.2$$

(3 marks)

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(continued on the next page)

Turn over

1. continued.

(b) Work out

$$59.84 \div 1.6$$

(3 marks)

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(Total for Question 1 is 6 marks)

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Turn over

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

It shows an incomplete Venn diagram.

$$\mathcal{E} = \{\text{even numbers less than } 19\}$$

$$A = \{6, 12, 18\}$$

$$B = \{2, 6, 14, 18\}$$

Complete the Venn diagram in the Diagram Booklet for this information.

(Total for Question 2 is 3 marks)

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3. Work out

$$4\frac{1}{5} - 2\frac{2}{3}$$

Give your answer as a mixed number.

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(Total for Question 3 is 3 marks)

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Turn over



**4. At the end of 2017**

**the value of Tamara's house was £220 000**

**the value of Rahim's house was £160 000**

**At the end of 2019**

**the value of Tamara's house had decreased by 20%**

**the value of Rahim's house had increased by 30%**

**At the end of 2019, whose house had the greater value?**

**You must show how you get your answer.**

**(4 marks)**

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

4. continued.

(Total for Question 4 is 4 marks)

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5. Look at the information for Question 5 in the Diagram Booklet.

Rosie, Matilda and Ibrahim collect stickers.

Ibrahim has **24** more stickers than Matilda.

Ibrahim has more stickers than Rosie.

How many more?

(3 marks)

Answer space continues on the next page.

5. continued.

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(Total for Question 5 is 3 marks)

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6. Look at Diagram 1 and Diagram 2 for Question 6 in the Diagram Booklet.

You may be provided with a model.

Diagram 1 and the model show a prism.

The cross section of the prism shown in Diagram 2 is a right-angled triangle labelled **ABC**

Angle **ABC** is a right angle.

The base of the triangle, **BC = 5 cm**

The prism has length **25 cm**

The prism has volume  **$750 \text{ cm}^3$**

Work out the height of the prism.

(3 marks)

Answer space continues on the next page.

6. continued.

\_\_\_\_\_ cm

(Total for Question 6 is 3 marks)

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Turn over

7. Look at Diagram 1, Diagram 2 and the formula for Question 7 in the Diagram Booklet.

You may be provided with two models.

Diagram 1 and Model A show a cube with edges of length  $x$  cm

Diagram 2 and Model B show a sphere of radius 3 cm

The surface area of the cube is equal to the surface area of the sphere.

Show that  $x = \sqrt{k\pi}$  where  $k$  is an integer.

(4 marks)

Answer space continues on the next page.

7. continued.

(Total for Question 7 is 4 marks)

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8. Solve

$$y^2 = 5y + 24$$

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(Total for Question 8 is 3 marks)

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9. (a) Write down the value of  $7^0$

(1 mark)

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- (b) Find the value of

$$3 \times 3^6 \times 3^{-6}$$

(1 mark)

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(continued on the next page)

9. continued.

(c) Find the value of

$$2^{-4}$$

(1 mark)

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(d) Find the value of

$$27^{\frac{1}{3}}$$

(1 mark)

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(Total for Question 9 is 4 marks)

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

**It shows a shape made from 6 identical squares.**

**The total area of the shape is  $5406 \text{ cm}^2$**

**(a) Find an estimate for the length of one side of each square.**

**Give your answer correct to the nearest whole number.**

**(3 marks)**

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

10. (a) continued.

\_\_\_\_\_ cm

(b) Is your answer to part (a) an underestimate or an overestimate?

You must give a reason for your answer.

(1 mark)

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(Total for Question 10 is 4 marks)

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11. Look at the diagram for Question 11 in the Diagram Booklet.

It shows two rectangles, **A** and **B**

All measurements are in centimetres.

The area of rectangle **A** is equal to the area of rectangle **B**

Find an expression for **y** in terms of **w**

(4 marks)

Answer space continues on the next page.

11. continued.

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(Total for Question 11 is 4 marks)

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

**It shows a grid.**

**The cumulative frequency table below gives information about the heights, in cm, of 40 plants.**

<b>Height (h cm)</b>	<b>Cumulative Frequency</b>
<b><math>0 &lt; h \leq 5</math></b>	<b>5</b>
<b><math>0 &lt; h \leq 10</math></b>	<b>10</b>
<b><math>0 &lt; h \leq 15</math></b>	<b>25</b>
<b><math>0 &lt; h \leq 20</math></b>	<b>35</b>
<b><math>0 &lt; h \leq 25</math></b>	<b>38</b>
<b><math>0 &lt; h \leq 30</math></b>	<b>40</b>

**(a) On the grid in the Diagram Booklet, draw a cumulative frequency graph for this information.**

**(2 marks)**

**(continued on the next page)**



12. continued.

(b) Use the graph in the Diagram Booklet to find an estimate for the median height of the plants.

(1 mark)

\_\_\_\_\_ cm

(Total for Question 12 is 3 marks)

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13. Ted is trying to change  $0.\dot{4}\dot{3}$  to a fraction.

Here is the start of his method.

$$x = 0.\dot{4}\dot{3}$$

$$10x = 4.\dot{3}\dot{4}$$

$$10x - x = 4.\dot{3}\dot{4} - 0.\dot{4}\dot{3}$$

Evaluate Ted's method so far.

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(Total for Question 13 is 1 mark)

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

It shows the shape **ABCDEF**

All the measurements are in centimetres.

$$AB = x + 1$$

$$BC = 4$$

$$EF = 2x + 6$$

$$AF = x + 11$$

All the marked angles are right angles.

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

Show that  $A = 2x^2 + 24x + 46$

(3 marks)

Answer space continues on the next page.

14. continued.

(Total for Question 14 is 3 marks)

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15. Show that  $\frac{4y+3}{2y} + \frac{3}{5}$  can be written in the form  $\frac{ay+b}{cy}$  where  $a$ ,  $b$  and  $c$  are integers.

(3 marks)

Answer space continues on the next page.

15. continued.

(Total for Question 15 is 3 marks)

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16. There are only 3 red counters and 5 yellow counters in a bag.

Jude takes at random 3 counters from the bag.

Work out the probability that he takes exactly one red counter.

(4 marks)

Answer space continues on the next page.

16. continued.

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(Total for Question 16 is 4 marks)

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Turn over



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

It shows a grid.

On the grid show, by shading, the region that satisfies all of these inequalities.

$$2y + 4 < x$$

$$x < 3$$

$$y < 6 - 3x$$

Label the region **R**

(Total for Question 17 is 3 marks)

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Turn over

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

It shows trapezium **ABCD**

**AB** is parallel to **DC**

**BC** = 6 cm

Angle **BCD** =  $30^\circ$

The area of the trapezium is  $66 \text{ cm}^2$

the length of **AB**:the length of **CD** = 2:3

Find the length of **AB**

(5 marks)

Answer space continues on the next page.

18. continued.

\_\_\_\_\_ cm

(Total for Question 18 is 5 marks)

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19. Show that

$\frac{8 + \sqrt{12}}{5 + \sqrt{3}}$  can be written in the form  $\frac{a + \sqrt{3}}{b}$ ,

where  $a$  and  $b$  are integers.

(Total for Question 19 is 4 marks)

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Turn over

20. Look at the diagram for Question 20 in the Diagram Booklet.

It shows the graph of  $x^2 + y^2 = 30 \cdot 25$

Use the graph to find estimates for the solutions of the simultaneous equations

$$x^2 + y^2 = 30 \cdot 25$$

$$y - 2x = 1$$

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(Total for Question 20 is 3 marks)

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21. The functions **f** and **g** are such that

$$f(x) = 3x^2 + 1 \text{ for } x > 0 \text{ and}$$

$$g(x) = \frac{4}{x^2} \text{ for } x > 0$$

- (a) Work out **gf(1)**  
(2 marks)

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(continued on the next page)

21. continued.

The function  $h$  is such that  $h = (fg)^{-1}$

(b) Find  $h(x)$

(4 marks)

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(Total for Question 21 is 6 marks)

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Turn over

22. Find the coordinates of the turning point on the curve with equation

$$y = 9 + 18x - 3x^2$$

You must show all your working.

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

(Total for Question 22 is 4 marks)

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TOTAL FOR PAPER IS 80 MARKS

END OF PAPER

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