

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

Total Marks

**Mathematics**  
**Paper 1**  
**(Non-Calculator)**  
**Higher Tier**

**Tuesday 19 May 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. Tracing paper may be used.**

**YOU WILL BE GIVEN**

**Diagram Book**

**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 a model for Question 8**

**It is NOT accurate.**

**There may be spare copies of some diagrams.**

## **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. The first five terms of an arithmetic sequence are

1          4          7          10          13

Write down an expression, in terms of  $n$ , for the  $n$ th term of this sequence.

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(Total for Question 1 is 2 marks)

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2. Show that

$$2\frac{1}{3} \times 3\frac{3}{4} = 8\frac{3}{4}$$

(Total for Question 2 is 3 marks)

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Turn over

3. Look at the diagram for Question 3 in the Diagram Book.

It shows four graphs labelled graph **A**, graph **B**, graph **C** and graph **D**

Each of the equations in the table below is the equation of one of the graphs.

Complete the table.

Equation	Letter of graph
$y = -x^3$	
$y = x^3$	
$y = x^2$	
$y = \frac{1}{x}$	

(Total for Question 3 is 2 marks)

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4. Look at the diagram for Question 4 in the Diagram Book.

It shows four triangles.

Two of these triangles are congruent.

Write down the letters of these two triangles.

\_\_\_\_\_ and \_\_\_\_\_

(Total for Question 4 is 1 mark)

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5. Sean pays **£10** for **24** chocolate bars.

He sells all **24** chocolate bars for **50** pence each.

Work out Sean's percentage profit.

\_\_\_\_\_ %

(Total for Question 5 is 3 marks)

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

It shows the triangle **ADC**

**AED** and **ABC** are straight lines.

**EB** is parallel to **DC**

Angle **EBC** =  $148^\circ$

Angle **ADC** =  $63^\circ$

Work out the size of angle **EAB**

You must give a reason for each stage of your working.

(5 marks)

Answer space continues on the next page.

6. continued.

(Total for Question 6 is 5 marks)

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7. Look at the table and the diagram for Question 7 in the Diagram Book.

The table shows information about the heights, in **cm**, of a group of girls in Year 9

The stem and leaf diagram shows information about the heights, in **cm**, of a group of **15** boys in Year 9

Compare the distribution of the heights of the girls with the distribution of the heights of the boys.

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(Total for Question 7 is 3 marks)

8. Look at the diagram for Question 8 in the Diagram Book.

You may be provided with a model.

The diagram and the model show a prism placed on a horizontal floor.

The prism has height 3 metres

The volume of the prism is  $18 \text{ m}^3$

The pressure on the floor due to the prism is  $75 \text{ newtons/m}^2$

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

Work out the force exerted by the prism on the floor.  
(3 marks)

Answer space continues on the next page.

8. continued.

\_\_\_\_\_ newtons

(Total for Question 8 is 3 marks)

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9. Write these four numbers in order of size.  
Start with the smallest number.

$$6.72 \times 10^5$$

$$67.2 \times 10^{-4}$$

$$672 \times 10^4$$

$$0.000\,672$$

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(Total for Question 9 is 2 marks)

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10. Given that

$$\frac{w}{x} = \frac{2}{5} \quad \text{and} \quad \frac{x}{y} = \frac{3}{4}$$

find  $w:x:y$

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(Total for Question 10 is 3 marks)

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Turn over



11. (a) Find the value of

$$\sqrt[4]{81 \times 10^8}$$

(2 marks)

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(continued on the next page)

11. continued.

(b) Find the value of

$$64^{-\frac{1}{2}}$$

(2 marks)

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(continued on the next page)

11. continued.

(c) Write

$$\frac{3^n}{9^{n-1}}$$
 as a power of 3

(2 marks)

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(Total for Question 11 is 6 marks)

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

**It gives information about the weekly wages of 80 people.**

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

<b>Wage (£w)</b>	<b>Cumulative frequency</b>
<b><math>200 &lt; w \leq 250</math></b>	
<b><math>200 &lt; w \leq 300</math></b>	
<b><math>200 &lt; w \leq 350</math></b>	
<b><math>200 &lt; w \leq 400</math></b>	
<b><math>200 &lt; w \leq 450</math></b>	
<b><math>200 &lt; w \leq 500</math></b>	

**(continued on the next page)**

**12. continued.**

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

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

**(2 marks)**

**Juan says**

**“75% of this group of people have a weekly wage of £375 or less.”**

**(c) Is Juan correct?**

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

**(3 marks)**

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

12. (c) continued.

(Total for Question 12 is 6 marks)

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13. Liquid **A** and liquid **B** are mixed to make liquid **C**

Liquid **A** has a density of  $70 \text{ kg/m}^3$

Liquid **A** has a mass of  $1400 \text{ kg}$

Liquid **B** has a density of  $280 \text{ kg/m}^3$

Liquid **B** has a volume of  $30 \text{ m}^3$

Work out the density of liquid **C**

(3 marks)

Answer space continues on the next page.

13. continued.

\_\_\_\_\_ kg/m<sup>3</sup>

(Total for Question 13 is 3 marks)

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**14. Sally plays two games against Martin.**

**In each game, Sally could win, draw or lose.**

**In each game they play,**

**the probability that Sally will win against Martin**

**is  $0.3$**

**the probability that Sally will draw against Martin**

**is  $0.1$**

**Work out the probability that Sally will win**

**EXACTLY one of the two games against Martin.**

**(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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15. The straight line  $L_1$  has equation  $y = 3x - 4$   
The straight line  $L_2$  is perpendicular to  $L_1$  and  
passes through the point  $(9, 5)$

Find an equation of line  $L_2$

(3 marks)

Answer space continues on the next page.

15. continued.

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(Total for Question 15 is 3 marks)

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16. Shirley wants to find an estimate for the number of bees in her hive.

On Monday she catches **90** of the bees.

She puts a mark on each bee and returns them to her hive.

On Tuesday she catches **120** of the bees.

She finds that **20** of these bees have been marked.

- (a) Work out an estimate for the total number of bees in her hive.

(3 marks)

Answer space continues on the next page.

**16. (a) continued.**

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**Shirley assumes that none of the marks had rubbed off between Monday and Tuesday.**

**(b) If Shirley's assumption is wrong, explain what effect this would have on your answer to part (a) (1 mark)**

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

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**Turn over**

17. Make  $p$  the subject of the formula

$$m = \frac{3(1-p)}{p-4}$$

(4 marks)

Answer space continues on the next page.

17. continued.

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(Total for Question 17 is 4 marks)

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18.  $x$  is proportional to  $\sqrt{y}$  where  $y > 0$

$y$  is increased by 44%

Work out the percentage increase in  $x$

\_\_\_\_\_ %

(Total for Question 18 is 3 marks)

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Turn over

19. **f** and **g** are functions such that

$$f(x) = \frac{12}{\sqrt{x}} \quad \text{and} \quad g(x) = 3(2x + 1)$$

- (a) Find **g(5)**  
(1 mark)

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(continued on the next page)

19. continued.

Remember:

**f** and **g** are functions such that

$$f(x) = \frac{12}{\sqrt{x}} \quad \text{and} \quad g(x) = 3(2x + 1)$$

(b) Find **gf(9)**

(2 marks)

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(continued on the next page)

Turn over

19. continued.

Remember:

**f** and **g** are functions such that

$$f(x) = \frac{12}{\sqrt{x}} \quad \text{and} \quad g(x) = 3(2x + 1)$$

(c) Find  $g^{-1}(6)$

(2 marks)

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(Total for Question 19 is 5 marks)

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Turn over

20. Show that

$$\frac{\sqrt{180} - 2\sqrt{5}}{5\sqrt{5} - 5} \text{ can be written in the form}$$

$$a + \frac{\sqrt{5}}{b} \text{ where } a \text{ and } b \text{ are integers.}$$

(4 marks)

Answer space continues on the next page.

20. continued.

(Total for Question 20 is 4 marks)

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

It shows the triangle DEF

P is the midpoint of FD

Q is the midpoint of DE

$$\overrightarrow{FD} = \mathbf{a} \quad \text{and} \quad \overrightarrow{FE} = \mathbf{b}$$

Use a vector method to prove that PQ is parallel to FE

(4 marks)

Answer space continues on the next page.

**21. continued.**

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

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**Turn over**



22. Look at the diagram for Question 22 in the Diagram Book.

It shows two shaded shapes, **A** and **B**

Shape **A** is formed by removing a sector of a circle with radius  $(3x - 1)$  cm from a sector of the circle with radius  $(5x - 1)$  cm

Shape **B** is a circle of diameter  $(2 - 2x)$  cm

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

Find the value of **x**

You must show all your working.

(5 marks)

Answer space continues on the next page.

**22. continued.**

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

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**Turn over**

**23. Look at the information for Question 23 in the Diagram Book.**

**It shows four types of cards in a game.**

**Each card has a shaded circle or a white circle or a shaded triangle or a white triangle.**

**Express the total number of cards with a shaded shape as a fraction of the total number of cards with a triangle.**

**(3 marks)**

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

23. continued.

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(Total for Question 23 is 3 marks)

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**TOTAL FOR PAPER IS 80 MARKS**

**END OF PAPER**

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