

**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>					

**Y62277RA**

**YOU MUST HAVE**

**Ruler, protractor, compasses, writing and drawing equipment. 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 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.**

**You may be provided with a model for Question 8**

**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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**Turn over**

**Answer ALL questions.**

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

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

**7**

- 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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**Turn over**

**2. Show that**

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

**(3 marks)**

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

**Turn over**



**2. continued.**

**(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 on the next page is the equation of one of the graphs.**

3. continued.

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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Turn over

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.

(3 marks)

Answer space continues on the next page.

**5. continued.**

\_\_\_\_\_ %

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

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**Turn over**

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 is on the next two pages.

Turn over

**6. continued.**

**Turn over**



**6. continued.**

**(Total for Question 6 is 5 marks)**

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**Turn over**

- 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.**

**(3 marks)**

**Answer lines are 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. 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  $75 \text{ newtons/m}^2$**

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

**(continued on the next page)**

**Turn over**

**8. continued.**

**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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**Turn over**

9. Write these four numbers in order of size.

Start with the smallest number.

$$6.72 \times 10^5$$

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

$$672 \times 10^4$$

$$0.000\,672$$

(2 marks)

Answer space and answer lines  
continue on the next page.

Turn over

**9. continued.**

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

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**Turn over**



10. Given that

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

find  $w : x : y$

(3 marks)

Answer space continues on the next page.

**10. continued.**

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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)

Turn over

**11. continued.**

**(b) Find the value of**

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

**(2 marks)**

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**(continued on the next page)**

**Turn over**

**11. continued.**

**(c) Write**

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

**(2 marks)**

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

**Turn over**

**30**

**11. (c) continued.**

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**(Total for Question 11 is 6 marks)**

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**Turn over**

**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 on the next page.  
(1 mark)**

12. (a) continued.

<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)

Turn over



**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)**

**(continued on the next page)**

**Turn over**

**12. continued.**

**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.**

**Turn over**

**12. (c) continued.**

**(Total for Question 12 is 6 marks)**

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**Turn over**

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.**

\_\_\_\_\_  $\text{kg/m}^3$

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

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**Turn over**

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 is on the next page.

Turn over

**14. continued.**

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

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**Turn over**

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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**Turn over**

- 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.**

**(continued on the next page)**

**Turn over**

**16. continued.**

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

**(3 marks)**

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

**Turn over**

16. (a) continued.

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(continued on the next page)

Turn over

**16. continued.**

**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.

Turn over

**17. continued.**

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

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**Turn over**

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

$y$  is increased by 44%

Work out the percentage increase  
in  $x$

(3 marks)

Answer space continues on the next  
page.

Turn over



**18. continued.**

\_\_\_\_\_ %

**(Total for Question 18 is 3 marks)**

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**Turn over**

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

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

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

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(continued on the next page)

Turn over

**19. continued.**

**Remember:**

**f and g are functions such that**

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

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

**(2 marks)**

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

**Turn over**

19. (b) continued.

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(continued on the next page)

Turn over

**19. continued.**

**Remember:**

**f and g are functions such that**

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

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

**(2 marks)**

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

**Turn over**

**19. (c) continued.**

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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.

Turn over

**20. continued.**

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

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**Turn over**



**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 two pages.**

**Turn over**

**21. continued.**

**Turn over**

**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**

**(continued on the next page)**

**Turn over**

**22. continued.**

**Find the value of  $x$**

**You must show all your working.**

**(5 marks)**

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

**Turn over**

**22. continued.**

**Turn over**

**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 is on the next two pages.**

**Turn over**



**23. continued.**

**Turn over**

**23. continued.**

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**(Total for Question 23 is 3 marks)**

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**Turn over**

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**TOTAL FOR PAPER IS 80 MARKS**

**END OF PAPER**

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