

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.

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 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.

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.

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.

(Total for Question 1 is 2 marks)

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.

2. continued.

(Total for Question 2 is 3 marks)

Turn over

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

They show 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)

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)

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)

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°

Angle ADC = 63°

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)

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.

(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 m^3

The pressure on the floor due to the prism is 75 newtons/m^2

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

(continued on the next page)

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)

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.

(Total for Question 9 is 2 marks)

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.

(Total for Question 10 is 3 marks)

Turn over

11. (a) Find the value of

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

(2 marks)

(continued on the next page)

Turn over

11. continued.

(b) Find the value of

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

(2 marks)

(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

11. (c) continued.

(Total for Question 11 is 6 marks)

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.

Wage (£w)	Cumulative frequency
$200 < w \leq 250$	
$200 < w \leq 300$	
$200 < w \leq 350$	
$200 < w \leq 400$	
$200 < w \leq 450$	
$200 < w \leq 500$	

(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)

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)

Turn over

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

Liquid A has a density of 70 kg/m^3

Liquid A has a mass of 1400 kg

Liquid B has a density of 280 kg/m^3

Liquid B has a volume of 30 m^3

Work out the density of liquid C

(3 marks)

Answer space continues on the next page.

13. continued.

_____ **kg/m³**

(Total for Question 13 is 3 marks)

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.

14. continued.

(Total for Question 14 is 3 marks)

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.

(Total for Question 15 is 3 marks)

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)

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.

16. (a) continued.

(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)

(Total for Question 16 is 4 marks)

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.

(Total for Question 17 is 4 marks)

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.**

18. continued.

_____ %

(Total for Question 18 is 3 marks)

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)

(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.

(continued on the next page)

Turn over

19. continued.

Remember:

f and g are functions such that

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

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

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

Turn over

19. (c) continued.

(Total for Question 19 is 5 marks)

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)

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.

21. continued.

Turn over

21. continued.

(Total for Question 21 is 4 marks)

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)

22. continued.

Find the value of x

You must show all your working.

(5 marks)

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

22. continued.

Turn over

22. continued.

(Total for Question 22 is 5 marks)

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.

(Total for Question 23 is 3 marks)

Turn over

TOTAL FOR PAPER IS 80 MARKS

END OF PAPER
