

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.

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.

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)

2. Show that

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

(Total for Question 2 is 3 marks)

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)

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.

_____ %

(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 continues on the next page.

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.

(Total for Question 7 is 3 marks)

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 m^3

The pressure on the floor due to the prism is 75 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)

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

$$6.72 \times 10^5$$

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

$$672 \times 10^4$$

$$0.000\,672$$

(Total for Question 9 is 2 marks)

10. Given that

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

find $w : x : y$

(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)

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)

(Total for Question 11 is 6 marks)

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 below.
(1 mark)**

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)

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)

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)

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.

(Total for Question 14 is 3 marks)

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)

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.

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)

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)

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)

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)

(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)

(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 page.

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**

Find the value of **x**

You must show all your working.

(5 marks)

Answer space continues on the next page.

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 continues on the next page.

23. continued.

(Total for Question 23 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

END OF PAPER
