

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

Total Marks

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

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

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

Turn over

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.

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)

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

1. (a) continued.

(continued on the next page)

1. continued.

(b) Work out

$$59 \cdot 84 \div 1 \cdot 6$$

(3 marks)

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

Turn over

1. (b) continued.

(Total for Question 1 is 6 marks)

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)

3. Work out

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

Give your answer as a mixed number.

(3 marks)

Answer space continues on the next page.

Turn over

3. continued.

(Total for Question 3 is 3 marks)

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%

(continued on the next page)

4. continued.

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 two pages.

4. continued.

Turn over

4. continued.

(Total for Question 4 is 4 marks)

Turn over

- 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.

(Total for Question 5 is 3 marks)

Turn over

- 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**

(continued on the next page)

6. continued.

The prism has length 25 cm

The prism has volume 750 cm^3

Work out the height of the prism.

(3 marks)

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

6. continued.

Turn over

6. continued.

_____ **cm**

(Total for Question 6 is 3 marks)

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.

(continued on the next page)

7. continued.

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)

Turn over

8. Solve

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

(Total for Question 8 is 3 marks)

Turn over

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

(1 mark)

(continued on the next page)

9. continued.

(b) Find the value of

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

(1 mark)

(continued on the next page)

Turn over

9. continued.

(c) Find the value of

$$2^{-4}$$

(1 mark)

(continued on the next page)

Turn over

9. continued.

(d) Find the value of

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

(1 mark)

(Total for Question 9 is 4 marks)

Turn over

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 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

(continued on the next page)

Turn over

10. continued.

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

**You must give a reason for your
answer.**

(1 mark)

(Total for Question 10 is 4 marks)

Turn over

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 two pages.

11. continued.

Turn over

11. continued.

(Total for Question 11 is 4 marks)

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

It shows a grid.

The cumulative frequency table on the next page gives information about the heights, in cm, of 40 plants.

12. continued.

Height (h cm)	Cumulative Frequency
$0 < h \leq 5$	5
$0 < h \leq 10$	10
$0 < h \leq 15$	25
$0 < h \leq 20$	35
$0 < h \leq 25$	38
$0 < h \leq 30$	40

(continued on the next page)

Turn over

12. continued.

**(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)

Turn over

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.

(Total for Question 13 is 1 mark)

Turn over

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 $A \text{ cm}^2$

(continued on the next page)

Turn over

14. continued.

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)

Turn over

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 two pages.

15. continued.

Turn over

15. continued.

(Total for Question 15 is 3 marks)

Turn over

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 two pages.

16. continued.

16. continued.

(Total for Question 16 is 4 marks)

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

(3 marks)

Space for working is on the next page.

Turn over

17. continued.

(Total for Question 17 is 3 marks)

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°

The area of the trapezium is 66 cm^2

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

Find the length of AB

(5 marks)

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

Turn over

18. continued.

Turn over

18. continued.

_____ **cm**

(Total for Question 18 is 5 marks)

Turn over

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.

(4 marks)

Answer space continues on the next page.

19. continued.

(Total for Question 19 is 4 marks)

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

$$x^2 + y^2 = 30 \cdot 25$$
$$y - 2x = 1$$

(3 marks)

Answer space is on the next page.

20. continued.

(Total for Question 20 is 3 marks)

Turn over

21. The functions f and g are such that

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

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

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

(continued on the next page)

Turn over

21. continued.

The function h is such that

$$h = (fg)^{-1}$$

(b) Find $h(x)$

(4 marks)

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

21. (b) continued.

(Total for Question 21 is 6 marks)

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.

(4 marks)

Answer space continues on the next page.

22. continued.

(_____ , _____)

(Total for Question 22 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS
END OF PAPER
