

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

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, Formulae Sheet (enclosed). Tracing paper may be used.

YOU WILL BE GIVEN

Diagram Booklet

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.

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

**You may be provided with a model for Question 9
It is NOT accurate.**

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. Solve

$$7x - 27 < 8$$

(Total for Question 1 is 2 marks)

Turn over

2. Write 124 as a product of its prime factors.

(2 marks)

Answer space continues on the next page.

2. continued.

(Total for Question 2 is 2 marks)

Turn over

3. A delivery company has a total of 160 cars and vans.

the number of cars : the number of vans = 3 : 7

Each car and each van uses electricity or diesel or petrol.

$\frac{1}{8}$ of the cars use electricity.

25% of the cars use diesel.

The rest of the cars use petrol.

(continued on the next page)

3. continued.

Work out the number of cars that use petrol.

You must show all your working.

(5 marks)

Answer space continues on the next two pages.

3. continued.

Turn over

3. continued.

(Total for Question 3 is 5 marks)

Turn over

4. (a) Write

1.63×10^{-3} as an ordinary
number.

(1 mark)

(continued on the next page)

Turn over

4. continued.

(b) Write

438 000 in standard form.

(1 mark)

(continued on the next page)

Turn over

4. continued.

(c) Work out

$$\left(4 \times 10^3\right) \times \left(6 \times 10^{-5}\right)$$

Give your answer in standard form.

(2 marks)

Answer space continues on the next page.

4. (c) continued.

(Total for Question 4 is 4 marks)

Turn over

5. Look at the diagram for Question 5 in the Diagram Booklet.

It shows a regular hexagon and a regular pentagon which share a common side.

Work out the size of the angle marked X

You must show all your working.

(3 marks)

Answer space continues on the next two pages.

5. continued.

Turn over

5. continued.

○

(Total for Question 5 is 3 marks)

Turn over

6. (a) Complete the table of values below for

$$y = x^2 - 3x + 1$$

There are four spaces to fill.

(2 marks)

Space for working is on the next page.

x	y
-1	
0	1
1	-1
2	
3	
4	

Turn over

6. (a) continued.

(continued on the next page)

Turn over

6. continued.

**(b) Look at the diagram
for Question 6(b) in the
Diagram Booklet.**

It shows a grid.

**On the grid, draw the graph of
 $y = x^2 - 3x + 1$ for values of x
from -1 to 4**

(2 marks)

(continued on the next page)

6. continued.

(c) Using your graph, find estimates for the solutions of the equation

$$\mathbf{x^2 - 3x + 1 = 0}$$

(2 marks)

(Total for Question 6 is 6 marks)

Turn over

7. Look at the diagram for Question 7 in the Diagram Booklet.

It shows cube A and cube B

Cube A has sides of length 3 cm

Cube B has sides of length 4 cm

Cube A has a mass of 81 grams.

Cube B has a mass of 128 grams.

Work out

**the density of cube A : the density of
cube B**

(continued on the next page)

Turn over

7. continued.

**Give your answer in the form $a : b$,
where a and b are integers.**

(3 marks)

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

7. continued.

(Total for Question 7 is 3 marks)

Turn over

8. Look at the table for Question 8 in the Diagram Booklet.

It shows the amount of snow, in cm, that fell each day for 30 days.

Work out an estimate for the mean amount of snow per day.

(3 marks)

Answer space continues on the next two pages.

8. continued.

Turn over

8. continued.

_____ cm

(Total for Question 8 is 3 marks)

- 9. Look at the diagram for Question 9 in the Diagram Booklet.**

You may be provided with a model.

A cube is placed on top of a cuboid to form a solid, as shown by the diagram and the model.

The cube has edges of length 4 cm

The cuboid has dimensions 7 cm by 6 cm by 5 cm

Work out the total surface area of the solid.

(3 marks)

Answer space is on the next two pages.

Turn over

9. continued.

Turn over

9. continued.

_____ **cm²**

(Total for Question 9 is 3 marks)

Turn over

10. Look at the table for Question 10 in the Diagram Booklet.

It shows some information about the profit made each day at a cricket club on 100 days.

(continued on the next page)

10. continued.

(a) Complete the cumulative frequency table below.

There are six spaces to fill.

(1 mark)

Profit (£x)	Cumulative frequency
$0 \leq x < 50$	
$0 \leq x < 100$	
$0 \leq x < 150$	
$0 \leq x < 200$	
$0 \leq x < 250$	
$0 \leq x < 300$	

(continued on the next page)

Turn over

10. continued.

**(b) Look at the diagram for
Question 10(b) in the
Diagram Booklet.**

It shows a grid.

**On the grid, draw a cumulative
frequency graph for this
information.**

(2 marks)

(continued on the next page)

10. continued.

(c) Use your graph to find an estimate for the number of days on which the profit was less than £125

(1 mark)

_____ **days**

(continued on the next page)

Turn over

10. continued.

**(d) Use your graph to find an estimate
for the interquartile range.**

(2 marks)

£_____

(Total for Question 10 is 6 marks)

Turn over

11. Look at the information for Question 11 in the Diagram Booklet. Cormac has some sweets in a bag. The sweets are lime flavoured or strawberry flavoured or orange flavoured.

Cormac is going to take at random a sweet from the bag.

The probability that he takes a lime flavoured sweet is $\frac{3}{7}$

**Work out the value of x
(3 marks)**

Answer space is on the next two pages.

Turn over

11. continued.

Turn over

11. continued.

x = _____

(Total for Question 11 is 3 marks)

Turn over

12. Express

$0.\dot{1}\dot{1}\dot{7}$ as a fraction.

You must show all your working.

(3 marks)

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

12. continued.

(Total for Question 12 is 3 marks)

Turn over

13. Look at the diagram for Question 13 in the Diagram Booklet.

A right-angled triangle is formed by the diameters of three semicircular shaded regions, **A, **B** and **C** as shown in the diagram.**

Show that

area of region **A =**

area of region **B + area of region **C****

(3 marks)

Answer space continues on the next two pages.

Turn over

13. continued.

Turn over

13. continued.

(Total for Question 13 is 3 marks)

Turn over

14. Look at the diagram for Question 14 in the Diagram Booklet.

It shows a speed–time graph.

- (a) Work out an estimate of the gradient of the graph at $t = 2$ (3 marks)**

Answer space continues on the next page.

14. (a) continued.

(continued on the next page)

Turn over

14. continued.

**(b) What does the area under the
graph represent?**

(1 mark)

(Total for Question 14 is 4 marks)

Turn over

15. **A, B and C** are three points such that

$$\overrightarrow{AB} = 3a + 4b$$

$$\overrightarrow{AC} = 15a + 20b$$

(a) Prove that **A, B and C** lie on a straight line.

(2 marks)

Answer space continues on the next page.

15. (a) continued.

(continued on the next page)

15. continued.

D, E and F are three points on a straight line such that

$$\overrightarrow{DE} = 3e + 6f$$

$$\overrightarrow{EF} = -10e - 5f$$

(b) Find the ratio

length of DF : length of DE

(3 marks)

Answer space continues on the next two pages.

Turn over

15. (b) continued.

15. (b) continued.

(Total for Question 15 is 5 marks)

16. A first aid test has two parts, a theory test and a practical test.

The probability of passing the theory test is 0.75

The probability of passing only one of the two parts is 0.36

The two events are independent.

Work out the probability of passing the practical test.

(4 marks)

Answer space continues on the next three pages.

16. continued.

Turn over

16. continued.

Turn over

16. continued.

(Total for Question 16 is 4 marks)

Turn over

17. y is directly proportional to the square root of t

$$y = 15 \text{ when } t = 9$$

t is inversely proportional to the cube of x

$$t = 8 \text{ when } x = 2$$

Find a formula for y in terms of x

Give your answer in its simplest form.

(4 marks)

Answer space continues on the next two pages.

17. continued.

Turn over

17. continued.

(Total for Question 17 is 4 marks)

Turn over

18. Work out the value of

$$\frac{\left(5\frac{4}{9}\right)^{-\frac{1}{2}} \times \left(4\frac{2}{3}\right)}{2^{-3}}$$

You must show all your working.

(4 marks)

Answer space continues on the next two pages.

18. continued.

Turn over

18. continued.

(Total for Question 18 is 4 marks)

Turn over

19. Solve

$$\frac{1}{2x-1} + \frac{3}{x-1} = 1$$

Give your answer in the form

$\frac{p \pm \sqrt{q}}{2}$ where p and q are integers.

(4 marks)

Answer space continues on the next three pages.

19. continued.

Turn over

19. continued.

Turn over

19. continued.

(Total for Question 19 is 4 marks)

Turn over

20. The centre of a circle is the point with coordinates $(-1, 3)$

The point A with coordinates $(6, 8)$ lies on the circle.

Find an equation of the tangent to the circle at A

Give your answer in the form

$ax + by + c = 0$ where a , b and c are integers.

(4 marks)

Answer space continues on the next three pages.

20. continued.

Turn over

20. continued.

Turn over

20. continued.

(Total for Question 20 is 4 marks)

Turn over

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

It shows three circles, each of radius 4 cm

The centres of the circles are A, B and C such that ABC is a straight line and $AB = BC = 4$ cm

Work out the total area of the two shaded regions.

Give your answer in terms of π (5 marks)

Answer space continues on the next two pages.

21. continued.

Turn over

21. continued.

_____ **cm²**

(Total for Question 21 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

END OF PAPER
