

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

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|-------------|
| 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.

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.**

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)

- 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)

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.

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.

3. continued.

(Total for Question 3 is 5 marks)

4. (a) Write

1.63×10^{-3} as an ordinary number.

(1 mark)

(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)

(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 page.

5. continued.

_____ o

(Total for Question 5 is 3 marks)

6. (a) Complete the table of values below for
 $y = x^2 - 3x + 1$

There are four spaces to fill.

(2 marks)

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

(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

$$y = x^2 - 3x + 1 \text{ for values of } x \text{ from } -1 \text{ to } 4$$

(2 marks)

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

$$x^2 - 3x + 1 = 0$$

(2 marks)

(Total for Question 6 is 6 marks)

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**

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)

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 page.

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 continues on the next page.

9. continued.

_____ cm^2

(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.

(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)

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)

(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)

10. continued.

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

(2 marks)

£ _____

(Total for Question 10 is 6 marks)

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 continues on the next page.

11. continued.

x = _____

(Total for Question 11 is 3 marks)

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)

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 page.

13. continued.

(Total for Question 13 is 3 marks)

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.

(b) What does the area under the graph represent?
(1 mark)

(Total for Question 14 is 4 marks)

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)

(continued on the next page)

15. continued.

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

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

$$\overrightarrow{EF} = -10\mathbf{e} - 21\mathbf{f}$$

(b) Find the ratio

length of **DF** : length of **DE**

(3 marks)

Answer space continues on the next page.

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 two pages.

16. continued.

16. continued.

(Total for Question 16 is 4 marks)

17. y is directly proportional to the square root of t
 $y = 15$ when $t = 9$

t is inversely proportional to the cube of x
 $t = 8$ 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 page.

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 page.

18. continued.

(Total for Question 18 is 4 marks)

19. Solve

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

Give your answer in the form

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

(4 marks)

Answer space continues on the next two pages.

19. continued.

19. continued.

(Total for Question 19 is 4 marks)

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 two pages.

20. continued.

20. continued.

(Total for Question 20 is 4 marks)

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 page.

21. continued.

_____ cm^2

(Total for Question 21 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

END OF PAPER
