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

Total Marks

Mathematics
PAPER 1 (Non–Calculator)
Higher Tier

Friday 19 May 2023 – Morning

Time: 1 hour 30 minutes

In the boxes below, write your name, centre number and candidate number.

Surname						
Other names						
Centre Number						
Candidate Number						

V75148A

Pearson

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 them.

You may be provided with models for Question 8, Question 16 and Question 22 They are 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. Work out

$$8 \cdot 46 \div 0 \cdot 15$$

(3 marks)

Answer space continues on the next page.

1. continued.

(Total for Question 1 is 3 marks)

2. Work out

$$7\frac{3}{8} - 2\frac{1}{2}$$

Give your answer as a mixed number.

(3 marks)

Answer space continues on the next page.

2. continued.

(Total for Question 2 is 3 marks)

3. A cube has a total surface area of

$150\ cm^2$

Work out the volume of the cube.

(4 marks)

Answer space continues on the next page.

3. continued.

_____ cm^3

(Total for Question 3 is 4 marks)

4. The table shows information about the daily rainfall in a town for 60 days.

Rainfall (R mm)	Frequency
$0 \leq R < 5$	5
$5 \leq R < 10$	25
$10 \leq R < 15$	15
$15 \leq R < 20$	10
$20 \leq R < 25$	5

(continued on the next page)

4. continued.

Look at the diagram for Question 4 in the Diagram Booklet.

It shows a blank grid.

On the grid, draw a frequency polygon for the information in the table on the previous page.

(Total for Question 4 is 2 marks)

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

It shows an incomplete Venn Diagram.

$\mathscr{E}$ = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}

A = {odd numbers}

B = {square numbers}

(a) Complete the Venn diagram in the Diagram Booklet for this information.

(3 marks)

(continued on the next page)

5. continued.

Remember:

$\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$A = \{\text{odd numbers}\}$

$B = \{\text{square numbers}\}$

A number is chosen at random from the universal set $\mathscr{E}$

(b) Find the probability that this number is in the set B'

(2 marks)

Answer space continues on the next page.

5. (b) continued.

(Total for Question 5 is 5 marks)

6. Look at the diagram for Question 6 in the Diagram Booklet.

It shows a scatter graph with information about the ages and weights of some babies.

(continued on the next page)

6. continued.

(a) Describe the relationship between the age and the weight of the babies.

(1 mark)

(continued on the next page)

6. continued.

Another baby has a weight of 6·0 kg

(b) Using the scatter graph in the Diagram Booklet, find an estimate for the age of this baby.

(2 marks)

_____ months

(Total for Question 6 is 3 marks)

7. The price of a holiday increases by 20%

This 20% increase adds £240 to the price of the holiday.

Work out the price of the holiday before the increase.

(2 marks)

Answer space continues on the next page.

7. continued.

£_____

(Total for Question 7 is 2 marks)

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

You may be provided with a model. They show a solid cylinder on a horizontal floor.

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

The cylinder has a volume of $1200\ \text{cm}^3$ height of $40\ \text{cm}$

The cylinder exerts a force of 90 newtons on the floor.

(continued on the next page)

8. continued.

Work out the pressure on the floor due to the cylinder.

(3 marks)

Answer space continues on the next two pages.

8. continued.

8. continued.

_____ newtons/cm^2

(Total for Question 8 is 3 marks)

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

It shows two intersecting straight lines on a grid.

Use the graphs to solve the simultaneous equations

$$2 - 2y = x$$

$$2y = 3x - 22$$

(1 mark)

Answer space continues on the next page.

9. continued.

x = _____

y = _____

(Total for Question 9 is 1 mark)

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

It shows a pentagon **ABCDE**

Angle **EAB = 120°**

Angle **BCD = 110°**

Angle **CDE = 135°**

Angle **AED = 4 × angle ABC**

Work out the size of angle **AED**

You must show all your working.

(4 marks)

Answer space continues on the next two pages.

10. continued.

10. continued.

(Total for Question 10 is 4 marks)

11. Write

$$\frac{(6x^5y^3)^2}{3x^2y^7 \times 4xy^{-3}}$$ in the form

$ax^b\ y^c$ where **a**, **b** and **c** are integers.

(3 marks)

Answer space continues on the next page.

11. continued.

(Total for Question 11 is 3 marks)

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

It shows a probability tree diagram.

Martha plays a game twice.

The probability tree diagram shows the probabilities that Martha will win or lose each game.

Find the probability that Martha will lose at least one game.

(3 marks)

Answer space continues on the next page.

12. continued.

(Total for Question 12 is 3 marks)

13. y is directly proportional to x

$y = 24$ when $x = 1 \cdot 5$

Work out the value of y when $x = 5$

(3 marks)

Answer space continues on the next page.

13. continued.

$y =$ _____

(Total for Question 13 is 3 marks)

14. (a) Write $\frac{1}{16}$ in the form 4^n where

n is an integer.

(1 mark)

(continued on the next page)

14. continued.

(b) Work out the value of

$$8^{\frac{5}{3}} - 9^{\frac{3}{2}}$$

(3 marks)

Answer space continues on the next page.

14. (b) continued.

(Total for Question 14 is 4 marks)

15. The equation of line L_1 is

$$y = 2x - 5$$

The equation of line L_2 is

$$6y + kx - 12 = 0$$

L_1 is perpendicular to L_2

Find the value of k

You must show all your working.

(3 marks)

Answer space continues on the next page.

15. continued.

$k =$ _____

(Total for Question 15 is 3 marks)

16. Look at the diagram for Question 16 in the Diagram Booklet.

You may be provided with two models.

Model 1 is a sphere.

Model 2 is made from two hemispheres showing the radius r

The diagram shows a sphere.

Surface area of sphere $= 4\pi r^2$

The radius of the sphere is marked r

$\frac{3}{8}$ of the surface area of this sphere is 75π cm^2

(continued on the next page)

16. continued.

Find the diameter of the sphere.

Give your answer in the form $a\sqrt{b}$

where a is an integer and b is a prime number.

(4 marks)

Answer space continues on the next page.

16. continued.

_____ cm

(Total for Question 16 is 4 marks)

17. Make y the subject of the formula

$$x = \frac{4(2y - 7)}{5y + 3}$$

(4 marks)

Answer space continues on the next page.

17. continued.

(Total for Question 17 is 4 marks)

18. 7 kg of carrots and 5 kg of tomatoes cost a total of 480 pence

cost of 1 kg of carrots : cost of 1 kg of tomatoes = 5 : 9

Work out the cost of 1 kg of carrots and the cost of 1 kg of tomatoes.

(4 marks)

Answer space continues on the next two pages.

18. continued.

18. continued.

carrots _____ pence

tomatoes _____ pence

(Total for Question 18 is 4 marks)

19. The menu in a restaurant has starters, main courses and desserts.

There are 5 starters.

There are 12 main courses.

There are x desserts.

There are 420 different ways to choose one starter, one main course and one dessert.

Work out the value of x

(2 marks)

Answer space is on the next page.

19. continued.

$x =$ _____

(Total for Question 19 is 2 marks)

20. For $x \geq 0$, the functions f and g are such that

$$f(x) = 3x + 4$$

$$g(x) = \frac{\sqrt{x} + 2}{5}$$

(a) Find $g^{-1}(x)$

(2 marks)

Answer space continues on the next page.

20. (a) continued.

$g^{-1}(x) =$ _____

(continued on the next page)

20. continued.

Remember:

$f(x) = 3x + 4$

$$g(x) = \frac{\sqrt{x} + 2}{5}$$

(b) Solve $gf(x) = 3$

(3 marks)

Answer space continues on the next page.

20. (b) continued.

$x =$ _____

(Total for Question 20 is 5 marks)

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

A, B and D are points on a circle with centre O

CDE is the tangent to the circle at D

Angle ABO = 51°

Angle BOD = 64°

Work out the size of angle ADC

Write down any circle theorems you use.

(4 marks)

Answer space continues on the next two pages.

21. continued.

21. continued.

_____°

(Total for Question 21 is 4 marks)

22. Look at the diagram for Question 22 in the Diagram Booklet.

You may be provided with a model.

They show a cuboid **ABCDEFGH**

AF = 6·8 cm

FC = 13·6 cm

Work out the size of the angle between **FC** and the plane **ABCD**

(2 marks)

Answer space continues on the next two pages.

22. continued.

22. continued.

_____ °

(Total for Question 22 is 2 marks)

23. Write

$$\frac{3\sqrt{3}}{4-\sqrt{3}} - \frac{2}{\sqrt{3}}$$ in the form

$$\frac{a\sqrt{3}+b}{c}$$ where a, b and c are integers.

(4 marks)

Answer space continues on the next two pages.

23. continued.

23. continued.

(Total for Question 23 is 4 marks)

24. Find the set of possible values of x for which

$$4x^2 - 25 < 0 \quad \text{AND}$$

$$12 - 5x - 3x^2 > 0$$

You must show all your working.

(5 marks)

Answer space continues on the next three pages.

24. continued.

24. continued.

24. continued.

(Total for Question 24 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

END OF PAPER