Paper Reference 4MA1/1H
Pearson Edexcel
International GCSE

Mathematics A
PAPER 1H
Higher Tier
(Calculator)

Time: 2 hours

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

Surname	
Other names	
Centre Number	
Candidate Number	

Y72437RA

Pearson

YOU MUST HAVE

Ruler, protractor, compasses, writing and drawing equipment, calculator. Tracing paper may be used.

YOU WILL BE GIVEN

Diagram Booklet
Formulae Pages

INSTRUCTIONS

Answer ALL questions.

Without sufficient working, correct answers may be awarded no marks.

Answer the questions in the spaces provided in this Question Paper or on the separate diagrams – there may be more space than you need.

CALCULATORS MAY BE USED.

You must NOT write anything on the Formulae Pages. Anything you write on the Formulae Pages will gain NO credit.

INFORMATION

The total mark for this paper is **100**

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.

ADVICE

Read each question carefully before you start to answer it.

Check your answers if you have time at the end.

Answer ALL TWENTY FOUR questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Look at the table for Question 1 in the Diagram Booklet.

80 students entered a dancing competition.

The table gives information about the length of time, in minutes, for which each student spent dancing.

Work out an estimate for the mean length of time the students spent dancing.

(4 marks)

Answer space continues on the next two pages.

1.   continued.

1.   continued.

_____ minutes

(Total for Question 1 is 4 marks)

2. **Solve**

$$3(2 - 4x) = 5 - 8x$$

Show clear algebraic working.

(3 marks)

Answer space continues on the next page.

2. **continued.**

x = _____

(Total for Question 2 is 3 marks)

3.   Look at the diagram for Question 3 in the Diagram Booklet.

Use ruler and compasses only to construct the perpendicular bisector of line **AB**

You must show all your construction lines.

(Total for Question 3 is 2 marks)

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

It is NOT accurately drawn.

It shows a pentagon **ABCDE**

Angle **ABC = 119°**

Angle **BCD = 67°**

Angle **CDE = 135°**

DEA is a right angle

Angle **EAB** is marked **x°**

Work out the value of **x**

(3 marks)

Answer space continues on the next page.

4. **continued.**

X = _____

(Total for Question 4 is 3 marks)

5.   In a box, there are only green sweets, orange sweets and yellow sweets.

There are **280** sweets in the box so that

the number of green sweets :
the number of orange sweets $= 2 : 3$

and

the number of orange sweets :
the number of yellow sweets $= 1 : 5$

(continued on the next page)

5. continued.

Work out how many green sweets there are in the box.

(3 marks)

Answer space continues on the next two pages.

5.   continued.

5. **continued.**

(Total for Question 5 is 3 marks)

6. Shane bought a car.

The amount Shane paid for the car was **$32 000**

Theresa also bought a car.

To pay for this car, Theresa paid a deposit of **$18 000** together with **14** monthly payments of **$1160**

(continued on the next page)

6.   continued.

Theresa paid more for her car than Shane paid for his car.

(a)   Work out how much more Theresa paid as a percentage of the amount Shane paid.

(4 marks)

Answer space continues on the next page.

6. **(a)** **continued.**

_____**%**

(continued on the next page)

6.   continued.

Kylie bought a van.

After **1** year, the value of the van was **$39 865**

During this year, the value of the van decreased by **15%**

(b)   Work out the value of the van when Kylie bought it.

(3 marks)

Answer space continues on the next page.

6. **(b)** **continued.**

$\underline{}

(Total for Question 6 is 7 marks)

7.   **Look at the table for Question 7 in the Diagram Booklet.**

Some members of a library were asked to name the type of book that they each liked to read the best.

One of the members is chosen at random.

The table shows information about the probability of the type of book that this member answered.

(continued on the next page)

7.   continued.

48 members answered comedy books.

Work out how many of the members answered mystery books.

(4 marks)

Answer space continues on the next page.

7.   continued.

(Total for Question 7 is 4 marks)

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

It is NOT accurately drawn.

The diagram shows a triangle **ABC** inside a semicircle.

A, **B** and **C** are points on the semicircle.

AB is the diameter of the semicircle.

Angle **ACB = 90°**

Angle **BAC = 50°**

AC = 18 cm

8. continued.

Work out the perimeter of the semicircle.

Give your answer correct to **2** significant figures.

(5 marks)

Answer space continues on the next three pages.

8. **continued.**

8. **continued.**

8.   continued.

_____ **cm**

(Total for Question 8 is 5 marks)

9. (a) Write

$$6 \cdot 25 \times 10^{-4}$$

as an ordinary number.

(1 mark)

_____

(continued on the next page)

9. continued.

(b) Work out

$$(2 \cdot 4 \times 10^{12}) \div (9 \cdot 6 \times 10^{4})$$

Give your answer in standard form.

(2 marks)

Answer space continues on the next page.

9. **(b)** **continued.**

_____

(Total for Question 9 is 3 marks)

Turn over

10. (a) Factorise

$$y^2 - 2y - 48$$

(2 marks)

_____

Turn over

10. continued.

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

    Write down the inequality shown on the number line in the Diagram Booklet.

    (1 mark)

_____

10. continued.

(c) **Solve the inequality**

$$7w + 6 > 12w + 14$$

(3 marks)

Answer space continues on the next page.

10. (c) continued.

_____

(Total for Question 10 is 6 marks)

11. Look at the diagram for Question 11 in the Diagram Booklet.

The region **R**, shown shaded in the diagram, is bounded by the straight lines with equations

$$2x + y = 6$$

$$2y = 5x + 1$$

$$3y + 2x = 4$$

(continued on the next page)

11. **continued.**

Write down the three inequalities that define R

_____

_____

_____

(Total for Question 11 is 3 marks)

12. (a) Given that

$$3^{\frac{1}{2}} \times 3^{\frac{2}{5}} = 3^m$$

work out the value of m

(1 mark)

m = _____

(continued on the next page)

Turn over

12. continued.

(b) Given that

$$5^{-10} \div 5^{-4} = 5^n$$

work out the value of n

(1 mark)

n = _____

(Total for Question 12 is 2 marks)

13. **Expand and simplify**

$$3x(2x - 5)^2$$

Show clear algebraic working.

(3 marks)

Answer space continues on the next page.

13. continued.

(Total for Question 13 is 3 marks)

14. (a) Complete the table of values on the next page for

$$y = \frac{2}{x}\left(5 - \frac{1}{x}\right)$$

There are two spaces to fill.

(1 mark)

Answer space continues on the next page.

14. **(a)** continued.

x	y
0·5	
1	8
2	
3	3·1
4	2·4
5	1·9

(continued on the next page)

14. continued.

(b) Look at the diagram for Question 14(b) in the Diagram Booklet.

On the grid, draw the graph of

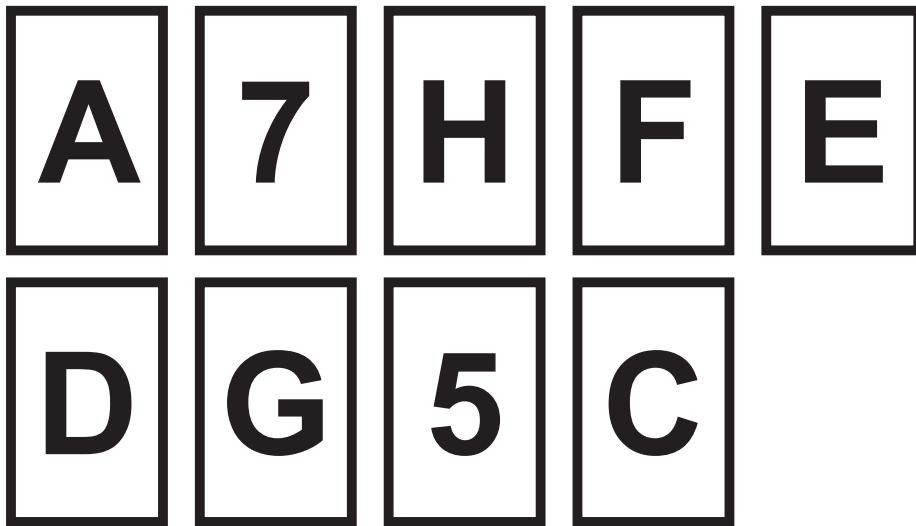$$y = \frac{2}{x}\left(5 - \frac{1}{x}\right) \text{ for } 0 \cdot 5 \le x \le 5$$

(2 marks)

(Total for Question 14 is 3 marks)

Turn over

15. **Here are nine cards.**

Each card has either a number on it or a letter on it.

A	7	H	F	E

D	G	5	C

Tomas is playing a game.

Tomas takes at random one of the cards and keeps it.

Tomas then takes at random another card and keeps it.

(continued on the next page)

Turn over

15. continued.

Look at the diagram for Question 15(a) in the Diagram Booklet.

(a) Complete the probability tree diagram.

There are six spaces to fill.

(2 marks)

(continued on the next page)

15. continued.

(b) Work out the probability that each of the two cards has a number on it.

(2 marks)

Answer space continues on the next page.

15. (b) continued.

_____

(continued on the next page)

15. continued.

(c) Work out the probability that there will be one card with a number on it and one card with a letter on it.

(3 marks)

Answer space continues on the next page.

15. (c)   continued.

_____

(Total for Question 15 is 7 marks)

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

It is NOT accurately drawn.

It shows a shape formed from two triangles **ABC** and **CDE**

ACD and **BCE** are straight lines.

In triangle **ABC**,

BC = 31 cm

AC = 24 cm

Angle **BAC = 64°**

In triangle **CDE**,

CD = 16 cm

CE = 19 cm

(continued on the next page)

16. continued.

Work out the length of **DE**

Give your answer correct to

3 significant figures.

(5 marks)

Answer space continues on the next

three pages.

16. continued.

16. continued.

16. continued.

_____**cm**

(Total for Question 16 is 5 marks)

17. **y is inversely proportional to $\sqrt{x}$**

$y = c^4$ when

$x = c^2$ where c is a positive

constant.

Find a formula for y in terms of

x and c

Give your answer in its simplest form.

(3 marks)

Answer space continues on the next

two pages.

17. continued.

17. continued.

_____

(Total for Question 17 is 3 marks)

18. The function **f** is such that

$$f(x) = \frac{k}{x}$$ where $x \neq 0$ and k is an integer.

(a) Express the inverse function f^{-1}

in the form $f^{-1}(x) = \ldots$

(1 mark)

$$f^{-1}(x) = \underline{\qquad\qquad}$$

(continued on the next page)

18. continued.

The function **g** is such that

$g(x) = 2 - 3x^4$ where $x \neq 0$

The function **h** is such that

$h(x) = \dfrac{3x}{2-x}$ where $x \neq 2$

(b) (i) Find $g(-2)$

(1 mark)

_____

(continued on the next page)

18. **(b)** **continued.**

   (ii) **Express the composite function hg in the form**

   $$hg(x) = \ldots$$

   Give your answer in its simplest form.

   (2 marks)

   Answer space continues on the next page.

18. (b) (ii) continued.

$$hg(x) = \underline{\hspace{4cm}}$$

(Total for Question 18 is 4 marks)

19. The acceleration, **a**, of an object is given by

$$a = \frac{v - u}{t}$$

where

v = 45·23

correct to **2** decimal places

u =   5·12

correct to **2** decimal places

t =   8·5

correct to **2** significant figures

(continued on the next page)

19. continued.

By considering bounds, work out the value of a to a suitable degree of accuracy.

Show your working clearly and give a reason for your answer.

(5 marks)

Answer space continues on the next two pages.

19. continued.

19. continued.

a = _____

(Total for Question 19 is 5 marks)

20. The radius of a right circular cylinder is x **cm**

The height of the cylinder is

$$\left(\frac{800}{\pi x} - x \right) \text{cm}$$

The volume of the cylinder is V **cm**^{3}

Find the maximum value of V

Give your answer correct to the nearest whole number.

(5 marks)

Answer space continues on the next four pages.

Turn over

20. continued.

20. continued.

20. continued.

20. continued.

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

It is NOT accurately drawn.

It shows the cross section of a circular water pipe.

OABC is a sector of the circle, centre **O**

$AO = 4 \cdot 8 \, cm$

Angle $AOC = 72°$

The shaded region in the diagram represents the water flowing in the pipe.

(continued on the next page)

Turn over

21. continued.

The water flows at 14 cm/s in the pipe.

Work out the volume of water that has flowed through the pipe in 3 minutes.

Give your answer in cm^3 correct to 3 significant figures.

(5 marks)

Answer space continues on the next four pages.

21. **continued.**

21. continued.

21. continued.

21. continued.

_____cm^3

(Total for Question 21 is 5 marks)

22. The first term of an arithmetic series is

$(2t + 1)$ where $t > 0$

The nth term of this arithmetic series is

$(14t - 5)$

The common difference of the series

is 3

The sum of the first n terms of the

series can be written as

$p(qt - 1)^r$ where p, q and r are

integers.

(continued on the next page)

22. continued.

Find the value of p, the value of q

and the value of r

Show clear algebraic working.

(4 marks)

Answer space continues on the next

four pages.

22. continued.

22. continued.

22. continued.

22. continued.

p = _____

q = _____

r = _____

(Total for Question 22 is 4 marks)

Turn over

23. The shape **ABCD** is a kite.

AB = AD and

CB = CD

The point **B** has coordinates $(k, 1)$ where k is a negative constant.

The point **D** has coordinates $(8, 7)$

The straight line **L** passes through the points **B** and **D**

The straight line **L** is parallel to the line with equation

$5y - 3x = 6$

(continued on the next page)

23. continued.

Find an equation of **AC**

Give your answer in the form

$px + qy = r$ where p, q and r are integers.

Show your working clearly.

(6 marks)

Answer space continues on the next three pages.

23. continued.

23. continued.

23. continued.

_____

(Total for Question 23 is 6 marks)

24. Look at the diagram for Question 24 in the Diagram Booklet.

It is NOT accurately drawn.

OAED is a quadrilateral.

$\overrightarrow{OA} = 2\underline{a}$

$\overrightarrow{OB} = 2\underline{b}$

$\overrightarrow{DE} = 7\underline{a} + 3\underline{b}$

AB : BD = 1 : 2

The point **C** on **AB** is such that **OCE** is a straight line.

(continued on the next page)

24. continued.

Use a vector method to find the ratio

of $OC : CE$

(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 100 MARKS

END OF PAPER