

Paper Reference 4MA1/2H
Pearson Edexcel
International GCSE

Total Marks

Mathematics A
Paper 2H
(Calculator)
Higher Tier

Wednesday 13 January 2021 – Afternoon
Time: 2 hours 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, calculator. Tracing paper may be used.

YOU WILL BE GIVEN

**Diagram Book
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.

Turn over

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.

You may be provided with models for Question 17(a) and Question 17(b).

There may be spare copies of some diagrams.

ADVICE

Read each question carefully before you start to answer it.

Check your answers if you have time at the end.

Answer ALL TWENTY TWO questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1. A train takes 6 hours 39 minutes to travel from New Delhi to Kanpur. The train travels a distance of 429 km**

Work out the average speed of the train.

Give your answer in km/h correct to one decimal place.

(3 marks)

Answer space continues on the next two pages.

1. continued.

Turn over

1. continued.

_____ **km/h**

(Total for Question 1 is 3 marks)

Turn over

2. Ava writes down five whole numbers.

For these five numbers

the median is 7

the mode is 8

the range is 5

**Find a possible value for each of the
five numbers that Ava writes down.**

(3 marks)

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

2. continued.

2. continued.

(Total for Question 2 is 3 marks)

Turn over

3. Gladys buys a table for \$465 to sell in her shop.

She sells the table for \$520

(a) Work out the percentage profit that Gladys makes from the sale of the table.

Give your answer correct to 3 significant figures.

(3 marks)

Answer space continues on the next page.

3. (a) continued.

_____ %

(continued on the next page)

Turn over

3. continued.

Gladys has a sale in her shop.

**She decreases all the normal prices
by 12%**

**The normal price of an armchair was
\$550**

**(b) Work out the sale price of the
armchair.**

(3 marks)

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

3. (b) continued.

\$_____

(Total for Question 3 is 6 marks)

Turn over

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

It shows a blank grid.

(a) On the grid in the Diagram Book, draw and LABEL the straight line with equation

(i) $x = 1.5$

(ii) $y = x$

(iii) $x + y = 6$

(3 marks)

(continued on the next page)

4. continued.

(b) On the grid, mark the region that satisfies ALL THREE of the inequalities

$$x \geq 1.5$$

$$y \geq x$$

$$x + y \leq 6$$

Label the region R

(1 mark)

(Total for Question 4 is 4 marks)

Turn over

5. (a) Expand and simplify

$$4p(2p + 5) - 3p(2p - 3)$$

(2 marks)

(continued on the next page)

Turn over

5. continued.

Given that

$$\frac{y^5 \times y^n}{y^6} = y^{13}$$

(b) work out the value of n
(2 marks)

n = _____

(continued on the next page)

Turn over

5. continued.

(c) (i) Solve the inequality

$$7t - 8 < 2t + 7$$

(2 marks)

(continued on the next page)

Turn over

5. (c) continued.

**(ii) Look at the diagram for
Question 5(c)(ii) in the
Diagram Book.**

**On the number line in the
Diagram Book, represent the
solution set of the inequality
solved in part (c)(i)
(1 mark)**

(Total for Question 5 is 7 marks)

6. (a) Write down the value of y^0
(1 mark)

- (b) Work out

$$\frac{9 \cdot 6 \times 10^{141} + 6 \cdot 4 \times 10^{140}}{3 \cdot 2 \times 10^{16}}$$

Give your answer in standard form.

(3 marks)

Answer space is on the next two pages.

6. (b) continued.

6. (b) continued.

(Total for Question 6 is 4 marks)

- 7. There are 5 cocoa pods in a bag.
The mean weight of the 5 cocoa pods
is 398 grams.**

**A sixth cocoa pod is put into the bag.
The mean weight of the 6 cocoa pods
is 401 grams.**

**Work out the weight of the sixth
cocoa pod that is put into the bag.
(3 marks)**

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

7. continued.

Turn over

7. continued.

_____ grams

(Total for Question 7 is 3 marks)

Turn over

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

It is NOT accurately drawn.

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

AOC is a diameter of the circle.

$AB = 8 \text{ cm}$

$BC = 15 \text{ cm}$

Angle $ABC = 90^\circ$

Triangle ABC is shaded.

(continued on the next page)

8. continued.

Work out the total area of the region not shaded in the diagram.

Give your answer correct to 3 significant figures.

(5 marks)

Answer space continues on the next three pages.

Turn over

8. continued.

8. continued.

8. continued.

_____ **cm²**

(Total for Question 8 is 5 marks)

Turn over

9. $A = 2^3 \times 3^2 \times 5^2 \times 11$
 $B = 2^4 \times 3 \times 5^4 \times 13$

Find the lowest common multiple (LCM) of A and B

Give your answer as a product of powers of prime numbers.

(2 marks)

Answer space continues on the next page.

9. continued.

(Total for Question 9 is 2 marks)

Turn over

10. The people working for a company work in Team A or in Team B

number of people in Team A : number of people in Team B = 3 : 4

$\frac{4}{5}$ of Team A work full time.

24% of Team B work full time.

Work out what fraction of the people working for the company work full time.

Give your fraction in its simplest form.

(3 marks)

Answer space is on the next three pages.

Turn over

10. continued.

Turn over

10. continued.

Turn over

10. continued.

(Total for Question 10 is 3 marks)

Turn over

11. Simplify fully

$$\left(\frac{9t^4 w^9}{18t^6 w^{10}} \right)^{-2}$$

(3 marks)

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

11. continued.

(Total for Question 11 is 3 marks)

Turn over

- 12. 15 people were asked how long, in minutes, they had been waiting for a bus.**

Here are the results.

2	3	3	4	5
6	6	8	9	10
11	13	14	15	18

Find the interquartile range of these times.

(2 marks)

Answer space continues on the next page.

12. continued.

_____ minutes

(Total for Question 12 is 2 marks)

Turn over

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

It is NOT accurately drawn.

P, Q, R, S and T are points on a circle with centre O

QOS is a diameter of the circle.

angle POS = 124°

angle PRS = m°

angle PTS = n°

(continued on the next page)

13. continued.

(a) Find the value of

(i) m

(ii) n

(2 marks)

(continued on the next page)

Turn over

13. continued.

(b) Find the size of angle QPO

(1 mark)



(Total for Question 13 is 3 marks)

Turn over

14. (a) Solve

$$\frac{9y - 7}{5} - \frac{3y - 7}{4} = 4 \cdot 55$$

Show clear algebraic working.

(3 marks)

Answer space continues on the next page.

14. (a) continued.

$y =$ _____

(continued on the next page)

Turn over

14. continued.

(b) Make t the subject of the formula

$$p = \sqrt{\frac{rt + 8}{3 + t}}$$

(4 marks)

Answer space continues on the next page.

14. (b) continued.

(Total for Question 14 is 7 marks)

Turn over

15. Look at the diagram for Question 15 in the Diagram Book.

It shows a histogram.

A postman records the weight of each parcel that he delivers.

The histogram in the Diagram Book shows information about the weights of all the parcels that the postman delivered last Monday.

No parcels weighed more than 6 kg

60 of the parcels that the postman delivered last Monday each had a weight between 0·5 kg and 2 kg

(continued on the next page)

15. continued.

- (a) Work out the total number of parcels the postman delivered last Monday.
(3 marks)**

(continued on the next page)

Turn over

15. continued.

The postman picks at random two of the records of the parcels he delivered last Monday.

- (b) Work out an estimate for the probability that each parcel weighed more than 2.5 kg (3 marks)**

(Total for Question 15 is 6 marks)

Turn over

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

It shows an incomplete Venn Diagram.

Some students were asked the following question.

“Which of the subjects Russian (R), French (F) and German (G) do you study?”

(continued on the next page)

16. continued.

Of these students

**4 study all three of Russian, French
and German**

10 study Russian and French

13 study French and German

6 study Russian and German

24 study German

11 study none of the three subjects

the number who study Russian

only is twice the number who study

French only.

**Let X be the number of students who
study French only.**

(continued on the next page)

Turn over

16. continued.

(a) Show all this information on the Venn diagram in the Diagram Book, giving the number of students in each appropriate subset, in terms of X where necessary.

(3 marks)

(continued on the next page)

16. continued.

**Given that the number of students
who were asked the question was 80**

**(b) work out the number of these
students that study Russian.**

(3 marks)

(Total for Question 16 is 6 marks)

Turn over

17. Look at Diagram 1 and Diagram 2 for Question 17(a) in the Diagram Book. You may be provided with a model. They are NOT accurate. Diagram 1 and the model show a solid prism **ABCDEFGH**

(continued on the next page)

17. continued.

Diagram 2 shows the trapezium $ABCD$, in which AD is parallel to BC

It is a cross section of the prism.

The base $ADEH$ of the prism is a horizontal plane.

$ADEH$ and $BCFG$ are rectangles.

The midpoint of BC is vertically above the midpoint of AD so that $BA = CD$

$$\mathbf{AD = HE = 37\text{ cm}}$$

$$\mathbf{BC = GF = 28\text{ cm}}$$

$$\mathbf{DE = AH = CF = BG = 24\text{ cm}}$$

(continued on the next page)

Turn over

17. continued.

The perpendicular distance between edges AD and BC is 20 cm

(a) Work out the total surface area of the prism.

(4 marks)

Answer space continues on the next two pages.

17. (a) continued.

17. (a) continued.

_____ **cm²**

(continued on the next page)

17. continued.

(b) Look at the diagram for Question 17(b) in the Diagram Book.

You may be provided with a model. They are NOT accurate.

The diagram and the model show the prism $ABCDEFGH$ with AF joined.

**Calculate the size of the angle between AF and the plane $ADEH$.
Give your answer correct to one decimal place.**

(3 marks)

Answer space is on the next four pages.

Turn over

17. (b) continued.

Turn over

17. (b) continued.

17. (b) continued.

Turn over

17. (b) continued.

○

(Total for Question 17 is 7 marks)

Turn over

18. A rectangle $ABCD$ is to be drawn on a centimetre grid such that

A has coordinates $(-4, -2)$

B has coordinates $(1, 10)$

C has coordinates $(19, p)$

D has coordinates (q, r)

**(a) Work out the value of p , the value of q and the value of r
(4 marks)**

Answer space continues on the next three pages.

18. (a) continued.

Turn over

18. (a) continued.

Turn over

18. (a) continued.

p = _____

q = _____

r = _____

(continued on the next page)

Turn over

18. continued.

- (b) Calculate the perimeter, in centimetres, of rectangle ABCD (3 marks)**

Answer space continues on the next three pages.

18. (b) continued.

18. (b) continued.

Turn over

18. (b) continued.

_____ **cm**

(Total for Question 18 is 7 marks)

19. A particle P is moving along a straight line.

The fixed point O lies on this line.

At time t seconds where $t \geq 0$, the displacement, s metres, of P from O is given by

$$s = t^3 + 5t^2 - 8t + 10$$

Find the displacement of P from O when P is instantaneously at rest.

Give your answer in the form $\frac{a}{b}$ where a and b are integers.

(5 marks)

Answer space is on the next three pages.

Turn over

19. continued.

Turn over

19. continued.

Turn over

19. continued.

_____ metres

(Total for Question 19 is 5 marks)

Turn over

20. Look at the diagram for Question 20 in the Diagram Book.

It is NOT accurately drawn.

It shows a regular hexagon labelled $ABCDEF$

An equilateral triangle labelled PQR has been shaded.

The unshaded region of the hexagon is labelled T

The points P and Q lie on AB such that $AB = 1.5 \times PQ$

Given that the area of region T is $72\sqrt{3} \text{ cm}^2$

**work out the length of PQ
(4 marks)**

Answer space is on the next two pages.

Turn over

20. continued.

Turn over

20. continued.

_____ **cm**

(Total for Question 20 is 4 marks)

Turn over

21. Write

$$\frac{25y^2 - 64}{5y^2 - 13y - 6} \times \frac{y^2 - 8y + 15}{5y + 8} - (y - 7)$$

as a single fraction in its simplest form.

Show clear algebraic working.

(4 marks)

Answer space continues on the next five pages.

21. continued.

Turn over

21. continued.

Turn over

21. continued.

Turn over

21. continued.

Turn over

21. continued.

(Total for Question 21 is 4 marks)

Turn over

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

It is NOT accurately drawn.

It shows a sector OBC of a circle with centre O and radius $(6 + y)$ cm

A is the point on OB and D is the point on OC such that

$OA = OD = 6$ cm

Angle $BOC = 50^\circ$

(continued on the next page)

22. continued.

Given that

**the perimeter of sector OBC =
2 × the perimeter of triangle OAD**

find the value of y

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

(6 marks)

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

Turn over

22. continued.

22. continued.

22. continued.

$y =$ _____

(Total for Question 22 is 6 marks)

Turn over

TOTAL FOR PAPER IS 100 MARKS

END OF PAPER
