

Paper Reference 4MA1/2H
Pearson Edexcel
International GCSE

Total Marks

Mathematics A
PAPER 2H
Higher Tier
(Calculator)

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**

Turn over

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.

There may be spare copies of some diagrams.

**You may be provided with a model for Question 10
It is NOT accurate.**

Turn over

ADVICE

Read each question carefully before you start to answer it.

Check your answers if you have time at the end.

Good luck with your examination.

Answer ALL TWENTY THREE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. **Write 600 as a product of powers of its prime factors.**

Show your working clearly.

(3 marks)

Answer space continues on the next two pages.

1. continued.

Turn over

1. continued.

(Total for Question 1 is 3 marks)

Turn over

2. Show that

$$2\frac{4}{7} \div 1\frac{1}{8} = 2\frac{2}{7}$$

(3 marks)

Answer space continues on the next page.

2. continued.

(Total for Question 2 is 3 marks)

Turn over

- 3. The bearing of Paris from London is 149°**

Work out the bearing of London from Paris.

(2 marks)

Answer space continues on the next page.

3. continued.

○

(Total for Question 3 is 2 marks)

Turn over

4. $\mathcal{E} = \{\text{letters of the alphabet}\}$

$B = \{b, r, a, z, i, l\}$

$I = \{i, r, e, l, a, n, d\}$

(a) List the members of the set

(i) $B \cup I$

(continued on the next page)

Turn over

4. (a) continued.

Remember:

$\mathcal{E} = \{\text{letters of the alphabet}\}$

$B = \{b, r, a, z, i, l\}$

$I = \{i, r, e, l, a, n, d\}$

(ii) $B \cap I'$

(2 marks)

(continued on the next page)

Turn over

4. continued.

Remember:

$\mathcal{E} = \{\text{letters of the alphabet}\}$

$B = \{b, r, a, z, i, l\}$

$I = \{i, r, e, l, a, n, d\}$

$K = \{k, e, n, y, a\}$

Cody writes down the statement

$$B \cap K = \emptyset$$

Cody's statement is wrong.

(b) Explain why.

(1 mark)

Answer space and lines continue
on the next page.

4. (b) continued.

(Total for Question 4 is 3 marks)

Turn over

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

It is NOT accurately drawn.

ABCD and **FGHI** are parallel straight lines.

EBGJ and **ECH** are straight lines.

$$BE = CE$$

$$\text{Angle } BEC = 44^\circ$$

Work out the size of angle **JGH**

Give a reason for each stage of your working.

(5 marks)

Answer space is on the next two pages.

Turn over

5. continued.

Turn over

5. continued.

○

(Total for Question 5 is 5 marks)

Turn over

6. Mariana sells bags of bird food.

The bags that Mariana sold last week each contained 12 kg of seeds.

The bags that she is going to sell next week will each contain a mixture of nuts and seeds where for each bag

**weight of nuts : weight of seeds =
4 : 5**

The total weight of the nuts and the seeds in each bag will be 19.35 kg

(continued on the next page)

Turn over

6. continued.

The weight of seeds in each bag that Mariana sells next week will be less than the weight of seeds in each bag that Mariana sold last week.

Work out this decrease as a percentage of the weight of seeds in each bag that Mariana sold last week.

Give your answer correct to one decimal place.

(4 marks)

Answer space continues on the next two pages.

Turn over

6. continued.

Turn over

6. continued.

_____ %

(Total for Question 6 is 4 marks)

Turn over

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

It is NOT accurately drawn.

It shows a right-angled triangle ABC

$$\mathbf{AB = x \text{ cm}}$$

$$\mathbf{AC = 6.5 \text{ cm}}$$

$$\mathbf{\text{Angle } ABC = 42^\circ}$$

Angle ACB is a right-angle.

Work out the value of x

Give your answer correct to one decimal place.

(3 marks)

Answer space is on the next two pages.

Turn over

7. continued.

Turn over

7. continued.

X = _____

(Total for Question 7 is 3 marks)

Turn over

8. Solve the simultaneous equations

$$5r + 2t = 10$$

$$2r - 4t = 7$$

Show clear algebraic working.

(3 marks)

Answer space continues on the next page.

Turn over

8. continued.

r = _____

t = _____

(Total for Question 8 is 3 marks)

Turn over

9. (i) Factorise

$$y^2 + 2y - 24$$

(2 marks)

(continued on the next page)

Turn over

9. continued.

(ii) Hence solve

$$y^2 + 2y - 24 = 0$$

(1 mark)

(Total for Question 9 is 3 marks)

Turn over

- 10. Look at Diagram 1 and Diagram 2 for Question 10 in the Diagram Book.**
You may be provided with a model.
They are NOT accurate.

Diagram 1 and the model show a triangular prism, ABCDEF

Diagram 2 shows the cross section of the prism, AED

$$\mathbf{BC = AD = 11.2 \text{ cm}}$$

$$\mathbf{DC = EF = AB = 15 \text{ cm}}$$

$$\mathbf{ED = FC = 7.4 \text{ cm}}$$

Angles AED and BFC are right angles.

(continued on the next page)

Turn over

10. continued.

Work out the volume of the prism.

Give your answer correct to

3 significant figures.

(5 marks)

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

10. continued.

Turn over

10. continued.

_____ **cm³**

(Total for Question 10 is 5 marks)

Turn over

- 11. Chengbo sold a house for 180 000 yuan.**

The amount for which he sold the house is 24% more than the amount he paid for the house.

- (a) Work out how much Chengbo paid for the house.**

Give your answer correct to 3 significant figures.

(3 marks)

Answer space continues on the next page.

11. (a) continued.

_____ yuan

(continued on the next page)

Turn over

11. continued.

Zhi bought a house on

1st January 2017

**When she bought the house, its value
was 120 000 yuan.**

**The value of the house increased by
1.8% per year.**

**(b) Work out the value of Zhi's house
on 1st January 2020**

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

(3 marks)

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

Turn over

11. (b) continued.

Turn over

11. (b) continued.

_____ yuan

(Total for Question 11 is 6 marks)

12. Look at the diagram for Question 12(a) in the Diagram Book.

It shows a grid.

The cumulative frequency table on the next page gives information about the distance, in kilometres, that each of 80 workers travel from home to work at Office A

12. continued.

Distance travelled (d km)	Cumulative frequency
$0 < d \leq 5$	10
$0 < d \leq 10$	30
$0 < d \leq 15$	50
$0 < d \leq 20$	70
$0 < d \leq 25$	77
$0 < d \leq 30$	80

(continued on the next page)

Turn over

12. continued.

**(a) On the grid in the Diagram Book,
draw a cumulative frequency
graph for the information in
the table.**

(2 marks)

**(b) Use your graph to find an
estimate for the median distance
travelled.**

(1 mark)

_____ **km**

(continued on the next page)

Turn over

12. continued.

- (c) Use your graph to find an estimate for the interquartile range of the distances travelled.
(2 marks)**

_____ **km**

(continued on the next page)

Turn over

12. continued.

For Office B, the median distance workers travel from home to work is 15 km and the interquartile range is 5 km

(d) Use the information above to compare the distances that workers at Office A and workers at Office B travel from home to work.

Write down TWO comparisons.

(2 marks)

Answer lines are on the next page.

Turn over

12. (d) continued.

1

2

(Total for Question 12 is 7 marks)

Turn over

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

It shows an incomplete probability tree.

Emilie takes part in two races.

The probability that she wins the first race is 0.7

The probability that she wins the second race is 0.4

The outcomes of the two races are independent.

(continued on the next page)

13. continued.

- (a) Complete the probability tree diagram in the Diagram Book. There are four spaces to fill.**

(2 marks)

- (b) Work out the probability that Emilie wins exactly one of the two races.**

(3 marks)

Answer space continues on the next page.

Turn over

13. (b) continued.

(continued on the next page)

Turn over

13. continued.

Emilie is going to take part in a third race.

If she wins both of the first two races, the probability that she will win the third race is 0.6

If she wins exactly one of the first two races, the probability that she will win the third race is 0.3

(continued on the next page)

13. continued.

**(c) Work out the probability that
Emilie will win exactly two of the
three races.**

(3 marks)

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

13. (c) continued.

(Total for Question 13 is 8 marks)

Turn over

14. Simplify fully

$$\left(\frac{9x^4}{16y^{10}} \right)^{-\frac{1}{2}}$$

(3 marks)

Answer space continues on the next page.

Turn over

14. continued.

(Total for Question 14 is 3 marks)

Turn over

15. (a) Complete the table of values for

$$y = \frac{1}{x}(x^2 + 4)$$

There are four spaces to fill.

(2 marks)

x	y
0.25	16.25
0.5	
1	
2	
4	
8	8.5

(continued on the next page)

Turn over

15. continued.

**(b) Look at the diagram for
Question 15(b) in the
Diagram Book.**

It shows a grid.

On the grid, draw the graph of

$$y = \frac{1}{x}(x^2 + 4) \text{ for } 0.25 \leq x \leq 8$$

(2 marks)

(Total for Question 15 is 4 marks)

16. A is inversely proportional to the square of r

Given that

$$\mathbf{A = 5 \text{ when } r = 0.3}$$

(a) find a formula for A in terms of r
(3 marks)

Answer space continues on the next page.

16. (a) continued.

(continued on the next page)

Turn over

16. continued.

Remember:

A is inversely proportional to the square of r

(b) Find the value of A when

$$\mathbf{r = 7.5A}$$

(3 marks)

Answer space continues on the next page.

Turn over

16. (b) continued.

A = _____

(Total for Question 16 is 6 marks)

Turn over

17. The straight line **L** passes through the points $(4, -1)$ and $(6, 4)$

The straight line **M** is perpendicular to **L** and intersects the y -axis at the point $(0, 8)$

Find the coordinates of the point where **M** intersects the x -axis.

(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. Look at the diagram for Question 18 in the Diagram Book.

It is NOT accurately drawn.

**ABCD is a quadrilateral where
A, B, C and D are points on a circle.**

$$\mathbf{AB = 8\text{ cm}}$$

$$\mathbf{BC = 7.5\text{ cm}}$$

$$\mathbf{\text{Angle } ABC = 98^\circ}$$

$$\mathbf{\text{Angle } ACD = 35^\circ}$$

(continued on the next page)

Turn over

18. continued.

**Work out the perimeter of
quadrilateral $ABCD$**

**Give your answer correct to
one decimal place.**

(6 marks)

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

Turn over

18. continued.

Turn over

18. continued.

Turn over

18. continued.

Turn over

18. continued.

_____ **cm**

(Total for Question 18 is 6 marks)

Turn over

19. Solve the simultaneous equations

$$y = 3 - 2x$$
$$x^2 + y^2 = 18$$

Show clear algebraic working.

(5 marks)

Answer space continues on the next two pages.

19. continued.

Turn over

19. continued.

(Total for Question 19 is 5 marks)

Turn over

20. Mathematically similar wooden blocks are made in a workshop.

There are small blocks and there are large blocks.

The volume of each small block is 300 cm^3

(continued on the next page)

20. continued.

Given that

the surface area of each small block :

the surface area of each large block =

25 : 36

work out the volume of each

large block.

(3 marks)

Answer space continues on the next

two pages.

Turn over

20. continued.

Turn over

20. continued.

_____ **cm³**

(Total for Question 20 is 3 marks)

Turn over

21. The point **A is the only stationary point on the curve with equation**

$$y = kx^2 + \frac{16}{x} \text{ where } k \text{ is a constant.}$$

Given that the coordinates of **A are $\left(\frac{2}{3}, n\right)$**

find the value of n

Show your working clearly.

(5 marks)

Answer space continues on the next three pages.

21. continued.

Turn over

21. continued.

Turn over

21. continued.

n = _____

(Total for Question 21 is 5 marks)

Turn over

22. The curve **S** has equation $y = f(x)$
where $f(x) = x^2$

The curve **T** has equation $y = g(x)$
where $g(x) = 2x^2 - 12x + 13$

By writing $g(x)$ in the form
 $a(x - b)^2 - c$, where a , b and c
are constants, describe fully a series
of transformations that map the
curve **S** onto the curve **T**
(4 marks)

Answer space and lines continue on
the next three pages.

22. continued.

Turn over

22. continued.

Turn over

22. continued.

(Total for Question 22 is 4 marks)

Turn over

23. Pippa has a box containing N pens.

There are only black pens and red pens in the box.

The number of black pens in the box is 3 more than the number of red pens.

Pippa is going to take at random 2 pens from the box.

The probability that she will take a black pen FOLLOWED by a red pen is $\frac{9}{35}$

(continued on the next page)

Turn over

23. continued.

Find the possible values of N

Show clear algebraic working.

(5 marks)

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

23. continued.

Turn over

23. continued.

Turn over

23. continued.

(Total for Question 23 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

END OF PAPER
