

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

Total Marks

Mathematics
Paper 2
(Calculator)
Higher Tier

Thursday 7 November 2019 – Morning
Time: 1 hour 30 minutes 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

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 BE USED.

If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Turn over

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.

**You may be provided with two models for Question 9
They are NOT accurate.**

You may be provided with a shape for Question 24

Turn over

ADVICE

Read each question carefully before you start to answer it.

Keep an eye on the time.

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. Look at the diagram for Question 1 in the Diagram Book.

It shows a frequency polygon.

The table shows some information about the weights of **55** potatoes.

Weight (w grams)	Frequency
$10 < w \leq 20$	5
$20 < w \leq 30$	20
$30 < w \leq 40$	15
$40 < w \leq 50$	10
$50 < w \leq 60$	5

(continued on the next page)

Turn over

1. continued.

Iveta drew the frequency polygon shown in the Diagram Book for the information in the table.

The frequency polygon is NOT fully correct.

(continued on the next page)

1. continued.

**Write down TWO things that are
wrong with the frequency polygon.**

1 _____

2 _____

(Total for Question 1 is 2 marks)

Turn over

2. The length of a pencil is 128 mm correct to the nearest millimetre.

Complete the error interval for the length of the pencil.

_____ mm \leq length $<$ _____ mm

(Total for Question 2 is 2 marks)

- 3. Look at the information for
Question 3 in the Diagram Book.
Tom and Adam have some stamps.**

**How many stamps does Tom buy
from Adam?**

You must show all your working.

(4 marks)

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

3. continued.

Turn over

3. continued.

(Total for Question 3 is 4 marks)

Turn over

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

Each person in a fitness club is going to get a free gift.

Stan is going to order the gifts.

Stan takes a sample of 50 people in the fitness club.

He asks each person to tell him the gift they would like.

The table in the Diagram Book shows information about his results.

(continued on the next page)

Turn over

4. continued.

There are 700 people in the fitness club.

(i) Work out how many sports bags Stan should order.

(2 marks)

Answer space continues on the next page.

4. (i) continued.

(continued on the next page)

Turn over

4. continued.

(ii) Write down any assumption you made AND explain how this could affect your answer.

(1 mark)

(Total for Question 4 is 3 marks)

Turn over

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

It shows six graphs labelled A, B, C, D, E, F

Write down the letter of the graph that could have the equation

(a) $y = x^3$

(1 mark)

(continued on the next page)

Turn over

5. continued.

(b) $y = \frac{1}{x}$

(1 mark)

(Total for Question 5 is 2 marks)

Turn over

6. The n th term of a sequence is $2n^2 - 1$

The n th term of a different sequence is $40 - n^2$

Show that there is only one number that is in both of these sequences.

(3 marks)

Answer space continues on the next page.

6. continued.

(Total for Question 6 is 3 marks)

Turn over

7. Work out

$$(3.42 \times 10^{-7}) \div (7.5 \times 10^{-6})$$

Give your answer in standard form.

(Total for Question 7 is 2 marks)

Turn over

8. The number of days, d , that it will take to build a house is given by

$$d = \frac{720}{n}$$

where n is the number of workers used each day.

Ali's company will take 40 days to build the house.

Hayley's company will take 30 days to build the house.

(continued on the next page)

8. continued.

Hayley's company will have to use more workers each day than Ali's company.

How many more?

(3 marks)

Answer space continues on the next page.

Turn over

8. continued.

(Total for Question 8 is 3 marks)

Turn over

9. Look at the diagrams for Question 9 in the Diagram Book.

You may be provided with two models.

They show a cube and a cuboid.

The cuboid has length 18 cm, width 8 cm and height 6 cm

The total surface area of the cube is equal to the total surface area of the cuboid.

(continued on the next page)

9. continued.

Janet says,

“The volume of the cube is equal to the volume of the cuboid.”

Is Janet correct?

You must show how you get your answer.

(5 marks)

Answer space continues on the next two pages.

Turn over

9. continued.

Turn over

9. continued.

(Total for Question 9 is 5 marks)

Turn over

10. Make k the subject of the formula

$$y = \sqrt{2m - k}$$

(2 marks)

Answer space continues on the next page.

10. continued.

(Total for Question 10 is 2 marks)

Turn over

**11. Look at the diagrams for Question 11
in the Diagram Book.**

**They show box plot M and box plot A
Megan grows potatoes.**

**Box plot M shows information about
the weights of Megan's potatoes.**

(continued on the next page)

11. continued.

Megan says that half of her potatoes weigh less than 50 grams each.

(a) Is Megan correct?

Give a reason for your answer.

(1 mark)

(continued on the next page)

Turn over

11. continued.

Amy also grows potatoes.

Box plot A shows information about the weights of Amy's potatoes.

(b) Compare the distribution of the weights of Megan's potatoes with the distribution of the weights of Amy's potatoes.

(2 marks)

Answer lines continue on the next page.

Turn over

11. (b) continued.

(Total for Question 11 is 3 marks)

**12. Look at the diagram for Question 12
in the Diagram Book.**

It shows triangle ABC

ADC and DEB are straight lines.

$AD = 4.4 \text{ cm}$

$BC = 8.6 \text{ cm}$

E is the midpoint of DB

Angle CDB = 90°

Angle DCB = 40°

(continued on the next page)

12. continued.

Work out the size of angle EAD

Give your answer correct to

1 decimal place.

You must show all your working.

(4 marks)

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

12. continued.

Turn over

12. continued.

○

(Total for Question 12 is 4 marks)

Turn over

13. Sakira invested £3550 in a savings account for 3 years.

She was paid 2·6% per annum compound interest for each of the first 2 years.

She was paid R% interest for the third year.

Sakira had £3819·21 in her savings account at the end of the 3 years.

(continued on the next page)

13. continued.

Work out the value of R

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

(3 marks)

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

13. continued.

(Total for Question 13 is 3 marks)

Turn over

14. Sadia is going to buy a new car.

For the car, she can choose one body colour, one roof colour and one wheel type.

She can choose from

19 different body colours

25 different wheel types

The total number of ways Sadia can choose the body colour and the roof colour and the wheel type is 3325

(continued on the next page)

14. continued.

Work out the number of different roof colours that Sadia can choose from.

(Total for Question 14 is 2 marks)

Turn over

15. Expand and simplify

$$(3y + 2)(2y + 1)(y - 5)$$

(3 marks)

Answer space continues on the next page.

15. continued.

(Total for Question 15 is 3 marks)

Turn over

16. Marek has nine cards.

There is a number on each card.

The cards are numbered from 1 to 9

1 2 3 4 5 6 7 8 9

Marek takes at random two of the cards.

He works out the product of the numbers on the two cards.

Work out the probability that the product is an even number.

(3 marks)

Answer space is on the next two pages.

Turn over

16. continued.

Turn over

16. continued.

(Total for Question 16 is 3 marks)

Turn over

17. Look at the diagram for Question 17 in the Diagram Book.

A and B are points on a circle with centre O

CAD is the tangent to the circle at A

BOD is a straight line.

Angle ODA = 32°

Work out the size of angle CAB

You must show all your working.

(3 marks)

Answer space is on the next two pages.

Turn over

17. continued.

Turn over

17. continued.

_____○

(Total for Question 17 is 3 marks)

Turn over

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

It shows an incomplete histogram.

The histogram gives information about the heights, in metres, of the trees in a park.

20% of the trees in the park have a height between 10 metres and 12.5 metres.

None of the trees in the park have a height greater than 25 metres.

Complete the histogram.

(3 marks)

Space for working is on the next page.

Turn over

18. continued.

(Total for Question 18 is 3 marks)

Turn over

19. Look at the diagram and the formula for Question 19 in the Diagram Book.

The diagram shows a hemisphere with diameter 8.4 cm

A hemisphere is half a sphere.

Work out the volume of the hemisphere.

Give your answer correct to 3 significant figures.

(2 marks)

Answer space continues on the next page.

19. continued.

_____ **cm³**

(Total for Question 19 is 2 marks)

Turn over

20.

$$d = \frac{1}{8}c^3$$

$c = 10.9$ correct to 3 significant figures.

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

Give a reason for your answer.

(4 marks)

Answer space continues on the next page.

Turn over

20. continued.

(Total for Question 20 is 4 marks)

Turn over

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

It shows a speed–time graph for a train journey between two stations.

The journey took 100 seconds.

- (a) Calculate the time taken by the train to travel half the distance between the two stations.**

You must show all your working.

(4 marks)

Answer space continues on the next page.

21. (a) continued.

_____ **seconds**

(continued on the next page)

Turn over

21. continued.

(b) Compare the acceleration of the train during the first part of its journey with the acceleration of the train during the last part of its journey.

(1 mark)

(Total for Question 21 is 5 marks)

Turn over

22. The number of rabbits on a farm at the end of month n is P_n

The number of rabbits at the end of the next month is given by

$$P_{n+1} = 1 \cdot 2P_n - 50$$

At the end of March there are 200 rabbits on the farm.

(a) Work out how many rabbits there will be on the farm at the end of June.

(3 marks)

Answer space is on the next two pages.

22. (a) continued.

Turn over

22. (a) continued.

(continued on the next page)

Turn over

22. continued.

(b) Considering your results in part (a), suggest what will happen to the number of rabbits on the farm after a long time.

(1 mark)

(Total for Question 22 is 4 marks)

Turn over

23. Look at the diagram for Question 23 in the Diagram Book.

It shows a parallelogram with sides $(2x - 1)$ cm and $(10 - x)$ cm

An angle of 150° is marked.

The area of the parallelogram is greater than 15 cm^2

**(a) Show that $2x^2 - 21x + 40 < 0$
(3 marks)**

Answer space continues on the next page.

23. (a) continued.

(continued on the next page)

Turn over

23. continued.

**(b) Find the range of possible values
of X**

(3 marks)

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

23. (b) continued.

(Total for Question 23 is 6 marks)

Turn over

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

It shows square $ABCD$ on a coordinate grid.

Square $ABCD$ is transformed by a combined transformation of a reflection in the line $x = -1$ followed by a rotation.

Under the combined transformation, two vertices of the square $ABCD$ are invariant.

(continued on the next page)

24. continued.

Describe fully one possible rotation.

**A cut out shape may be available if
you wish to use it.**

(Total for Question 24 is 2 marks)

- 25. The straight line L has equation**
 $3x + 2y = 17$

The point A has coordinates $(0, 2)$

**The straight line M is perpendicular to
 L and passes through A**

**Line L crosses the y -axis at the
point B**

Lines L and M intersect at the point C

Work out the area of triangle ABC

You must show all your working.

(5 marks)

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

Turn over

25. continued.

Turn over

25. continued.

Turn over

25. continued.

(Total for Question 25 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

END OF PAPER
