

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

Total Marks

Mathematics
Paper 1
(Non-Calculator)
Higher Tier

Tuesday 5 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. 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 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.

**You may be provided with two models for Question 17
They are NOT accurate.**

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. Find the Lowest Common Multiple (LCM) of
108 and 120
(3 marks)**

Answer space continues on the next page.

1. continued.

(Total for Question 1 is 3 marks)

Turn over

- 2. Look at the information for Question 2 in the Diagram Book.**

Using the information work out the value of n

You must show how you get your answer.

(4 marks)

Answer space continues on the next page.

2. continued.

n = _____

(Total for Question 2 is 4 marks)

Turn over

3. Work out

$$1\frac{3}{4} \times 1\frac{1}{3}$$

Give your answer as a mixed number.

(Total for Question 3 is 3 marks)

Turn over

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

Use a ruler and compasses to construct the line from the point **P** perpendicular to the line **CD**
You must show **ALL** construction lines.

(Total for Question 4 is 2 marks)

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

It shows triangle **ABC**

Angle **BAC** = 75°

Angle **ABC** = 51°

ADB is a straight line.

the size of angle **DCB** : the size of angle **ACD** = $2 : 1$

Work out the size of angle **BDC**

(4 marks)

Answer space continues on the next page.

5. continued.

o

(Total for Question 5 is 4 marks)

Turn over

6. Look at the information for Question 6 in the Diagram Book.

Donna says,

“The mean weight of the 10 bricks is less than 7 kg”

Is Donna correct?

You must show how you get your answer.

(3 marks)

Answer space continues on the next page.

6. continued.

(Total for Question 6 is 3 marks)

7. (a) Simplify

$$(p^2)^5$$

(1 mark)

(b) Simplify

$$12x^7y^3 \div 6x^3y$$

(2 marks)

(Total for Question 7 is 3 marks)

Turn over

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

The accurate scale drawing shows the positions of port **P** and a lighthouse **L**

1 cm on the diagram represents **2 km**

Aleena sails her boat from port **P** on a bearing of **070°**

She sails for $1\frac{1}{2}$ hours at an average speed of **12 km/h** to a port **Q**

Find

- (i) the distance, in **km**, of port **Q** from lighthouse **L**,
- (ii) the bearing of port **Q** from lighthouse **L**

(5 marks)

Answer space continues on the next page.

Turn over

8. continued.

distance **QL** = _____ km

bearing of **Q** from **L** = _____°

(Total for Question 8 is 5 marks)

Turn over

9. A car travels for **18** minutes at an average speed of **72 km/h**

(a) How far will the car travel in these **18** minutes?
(2 marks)

_____ km

(continued on the next page)

Turn over

9. continued.

David says,

“72 kilometres per hour is faster than 20 metres per second.”

(b) Is David correct?

You must show how you get your answer.

(2 marks)

(Total for Question 9 is 4 marks)

Turn over

10. The cumulative frequency table below shows information about the times, in minutes, taken by 40 people to complete a puzzle.

Time (m minutes)	Cumulative frequency
$20 < m \leq 40$	5
$20 < m \leq 60$	10
$20 < m \leq 80$	25
$20 < m \leq 100$	35
$20 < m \leq 120$	40

- (a) Look at the diagram for Question 10 in the Diagram Book.

On the grid, draw a cumulative frequency graph for the information in the table.

(2 marks)

(continued on the next page)

Turn over

10. continued.

(b) Use your graph to find an estimate for the interquartile range.

(2 marks)

_____ minutes

(continued on the next page)

10. continued.

One of the 40 people is chosen at random.

(c) Use your graph to find an estimate for the probability that this person took between 50 minutes and 90 minutes to complete the puzzle.

(2 marks)

(Total for Question 10 is 6 marks)

Turn over

11. There are p counters in a bag.

12 of the counters are yellow.

Shafiq takes at random 30 counters from the bag.

5 of these 30 counters are yellow.

Work out an estimate for the value of p

(Total for Question 11 is 2 marks)

Turn over

12.

$$T = \frac{m}{2} + 5$$

Here is Spencer's method to make m the subject of the formula.

$$2 \times T = m + 5$$

$$m = 2T - 5$$

What mistake did Spencer make in the first line of his method?

(Total for Question 12 is 1 mark)

13. (a) Write

$$\frac{5}{y+1} + \frac{2}{3y}$$

as a single fraction in its simplest form.

(2 marks)

(continued on the next page)

Turn over

13. continued.

(b) Factorise

$$(e + f)^2 + 3(e + f)$$

(1 mark)

(Total for Question 13 is 3 marks)

Turn over

14. Look at the diagram for Question 14 in the Diagram Book.

It shows a right-angled triangle **ABC**

$$BC = (y + 4) \text{ cm}$$

$$BA = (y - 2) \text{ cm}$$

All the measurements are in centimetres.

The area of the triangle is 27.5 cm^2

Work out the length of the shortest side of the triangle.

You must show all your working.

(4 marks)

Answer space continues on the next two pages.

14. continued.

Turn over

14. continued.

_____ cm

(Total for Question 14 is 4 marks)

Turn over

15. Express $0.4\overline{18}$ as a fraction.

You must show all your working.

(Total for Question 15 is 3 marks)

Turn over

16. (a) Rationalise the denominator of

$$\frac{22}{\sqrt{11}}$$

Give your answer in its simplest form.

(2 marks)

(continued on the next page)

16. continued.

(b) Show that

$\frac{\sqrt{3}}{2\sqrt{3}-1}$ can be written in the form

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

(3 marks)

(Total for Question 16 is 5 marks)

Turn over

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

You may be provided with two models.

They show two similar cylindrical containers, container **A** and container **B**

Container **A** is smaller than container **B**

the surface area of container **A** : the surface area of container **B** = 4 : 9

Tyler fills container **A** with water.

She then pours all the water into container **B**

Tyler repeats this and stops when container **B** is full of water.

Work out the number of times that Tyler fills container **A** with water.

You must show all your working.

(4 marks)

Answer space continues on the next page.

17. continued.

(Total for Question 17 is 4 marks)

Turn over

18. The function f is given by

$$f(x) = 2x^3 - 4$$

(a) Show that

$$f^{-1}(50) = 3$$

(2 marks)

(continued on the next page)

18. continued.

The functions g and h are given by

$$g(x) = x + 2 \text{ and } h(x) = x^2$$

(b) Find the values of x for which

$$hg(x) = 3x^2 + x - 1$$

(4 marks)

Answer space continues on the next page.

18. (b) continued.

(Total for Question 18 is 6 marks)

Turn over

19. Given that

$$9^{-\frac{1}{2}} = 27^{\frac{1}{4}} \div 3^{y+1}$$

find the exact value of y

(3 marks)

Answer space continues on the next page.

19. continued.

$y =$ _____

(Total for Question 19 is 3 marks)

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

The graph of $y = f(x)$ is shown on a grid.

- (a) On the grid, draw the graph with equation**
 $y = f(x + 1) - 5$
(2 marks)

(continued on the next page)

20. continued.

(b) Point **A**(−2, 1) lies on the graph of $y = f(x)$

When the graph of $y = f(x)$ is transformed to the graph with equation $y = f(-x)$, point **A** is mapped to point **B**

Write down the coordinates of point **B**

(1 mark)

(_____ , _____)

(Total for Question 20 is 3 marks)

Turn over

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

It shows a pair of axes.

Sketch the graph of

$$y = 2x^2 - 8x - 5$$

showing the coordinates of the turning point and the exact coordinates of any intercepts with the coordinate axes.

(Total for Question 21 is 5 marks)

Turn over

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

A, B, C and D are four points on a circle.

AEC and DEB are straight lines.

Triangle AED is an equilateral triangle.

Prove that triangle ABC is congruent to triangle DCB

(4 marks)

Answer space continues on the next page.

22. continued.

(Total for Question 22 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

END OF PAPER
