

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.

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 17
They are NOT accurate.**

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

Answer space continues on the next two pages.

1. continued.

Turn over

1. continued.

(Total for Question 1 is 3 marks)

- 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.

(3 marks)

Answer space continues on the next page.

Turn over

3. continued.

(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 is on the next two pages.

Turn over

5. continued.

Turn over

5. continued.

○

(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 is on the next page.

6. continued.

(Total for Question 6 is 3 marks)

Turn over

7. (a) Simplify

$$(p^2)^5$$

(1 mark)

(continued on the next page)

Turn over

7. continued.

(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°

(continued on the next page)

8. continued.

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)

Answer space continues on the next page.

9. (a) continued.

_____ 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)

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

Turn over

9. (b) continued.

(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

(continued on the next page)

Turn over

10. continued.

- (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)

10. continued.

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

(2 marks)

_____ minutes

(continued on the next page)

Turn over

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)

Answer space continues on the next page.

Turn over

10. (c) continued.

(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
(2 marks)**

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

11. continued.

(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?
(1 mark)

Answer lines continue on the next page.

Turn over

12. continued.

(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)

Answer space continues on the next page.

13. (a) continued.

(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

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

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

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 is on the next three pages.

Turn over

14. continued.

Turn over

14. continued.

Turn over

14. continued.

_____ **cm**

(Total for Question 14 is 4 marks)

Turn over

15. Express $0.4\dot{1}\dot{8}$ as a fraction.

You must show all your working.

(3 marks)

Answer space continues on the next page.

15. continued.

(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)

Answer space continues on the next page.

16. (b) continued.

(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

(continued on the next page)

17. continued.

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
two pages.**

17. continued.

Turn over

17. continued.

(Total for Question 17 is 4 marks)

Turn over

18. The function f is given by

$$\mathbf{f(x) = 2x^3 - 4}$$

(a) Show that

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

(2 marks)

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

18. (a) continued.

(continued on the next page)

18. continued.

The functions g and h are given by

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

(b) Find the values of x for which

$$\mathbf{hg(x) = 3x^2 + x - 1}$$

(4 marks)

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

Turn over

18. (b) continued.

Turn over

18. (b) continued.

(Total for Question 18 is 6 marks)

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.

Turn over

19. continued.

$y =$ _____

(Total for Question 19 is 3 marks)

Turn over

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)

Answer space continues on the next page.

Turn over

20. (b) continued.

(_____ , _____)

(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.

(5 marks)

Answer space continues on the next page.

21. continued.

(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 two pages.

Turn over

22. continued.

Turn over

22. continued.

(Total for Question 22 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

END OF PAPER
