

Paper Reference 4MA1/2H
Pearson Edexcel
International GCSE

Total Marks

Mathematics A
Paper 2H
(Calculator)
Higher Tier

Thursday 4 June 2020 – Morning

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 models for Question 9 and Question 18

ADVICE

Read each question carefully before you start to answer it.

Check your answers if you have time at the end.

**Answer ALL TWENTY ONE
questions.**

**Write your answers in the spaces
provided.**

**You must write down all the
stages in your working.**

1. (a) Simplify

$$m^6 \times m^4$$

(1 mark)

(b) Simplify

$$k^{10} \div k^3$$

(1 mark)

(continued on the next page)

Turn over

1. continued.

(c) Simplify

$$(3pq^4)^2$$

(2 marks)

(continued on the next page)

Turn over

1. continued.

(d) Solve the inequality

$$4t + 7 > 2$$

(2 marks)

(Total for Question 1 is 6 marks)

Turn over

2. Look at the table for Question 2 in the Diagram Book.

It shows information about the lengths of time, in minutes, 120 customers spent in a supermarket.

**(a) Write down the modal class.
(1 mark)**

(continued on the next page)

Turn over

2. continued.

(b) Work out an estimate for the mean length of time spent by the 120 customers in the supermarket.

(4 marks)

Answer space continues on the next page.

Turn over

2. (b) continued.

_____ minutes

(Total for Question 2 is 5 marks)

Turn over

3. Look at the diagram for Question 3 in the Diagram Book.

It is NOT accurately drawn.

It shows a parallelogram **ABCD** and an isosceles triangle **DEF** in which **$DE = DF$**

CDF and **ADE** are straight lines.

Angle $BCD = 58^\circ$

Work out the size of angle DEF

Give a reason for each stage of your working.

(5 marks)

Answer space is on the next two pages.

Turn over

3. continued.

Turn over

3. continued.

○

(Total for Question 3 is 5 marks)

Turn over

- 4. Andreas, Isla and Paulo share some money in the ratios $3 : 2 : 5$**

The TOTAL amount of money that Isla and Paulo receive is £76 more than the amount of money that Andreas receives.

Andreas buys a video game for £48.50 with some of his share of the money.

(continued on the next page)

4. continued.

Work out how much money Andreas has left from his share of the money when he has bought the video game.

(4 marks)

Answer space continues on the next two pages.

4. continued.

Turn over

4. continued.

£ _____

(Total for Question 4 is 4 marks)

Turn over

- 5. Himari's annual salary is
3 130 000 Japanese Yen (JPY)
She gets a salary increase of 4%**

**(a) Work out Himari's salary after
this increase.**

(3 marks)

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

5. (a) continued.

_____ JPY

(continued on the next page)

Turn over

5. continued.

Kaito bought a car.

**The value of the car when Kaito
bought it was 750 000 JPY**

**At the end of each year, the value of
his car had depreciated by 15%**

**(b) Work out the value of Kaito's car
at the end of 3 years.**

**Give your answer correct to the
nearest JPY**

(3 marks)

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

5. (b) continued.

Turn over

5. (b) continued.

_____ JPY

(Total for Question 5 is 6 marks)

Turn over

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

It shows line L on a grid.

**Find an equation for L
(2 marks)**

Answer space continues on the next page.

6. continued.

(Total for Question 6 is 2 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

$$\text{AC} = 3.4 \text{ cm}$$

$$\text{CB} = 4.7 \text{ cm}$$

Angle ACB is a right angle.

Angle ABC is marked x°

Calculate the value of x

Give your answer correct to one decimal place.

(3 marks)

Answer space is on the next three pages.

Turn over

7. continued.

Turn over

7. continued.

Turn over

7. continued.

x = _____

(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.

It shows an isosceles triangle PQR

$$\mathbf{PQ = PR = 8.5 \text{ cm}}$$

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

Work out the area of the triangle.

(4 marks)

Answer space continues on the next two pages.

8. continued.

Turn over

8. continued.

_____ **cm²**

(Total for Question 8 is 4 marks)

Turn over

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

You may be provided with a model.

They are NOT accurate.

They show a solid cylinder with radius 3 metres.

The volume of the cylinder is $72\pi\text{m}^3$

Calculate the TOTAL surface area of the cylinder.

Give your answer correct to 3 significant figures.

(5 marks)

Answer space is on the next page.

9. continued.

_____ m^2

(Total for Question 9 is 5 marks)

Turn over

10. Look at the table for Question 10 in the Diagram Book.

It shows information about the number of minutes each of 120 buses was late last Monday.

**(a) Complete the cumulative frequency table on the next page.
(1 mark)**

10. (a) continued.

Number of minutes late (L)	Cumulative frequency
$0 < L \leq 10$	
$0 < L \leq 20$	
$0 < L \leq 30$	
$0 < L \leq 40$	
$0 < L \leq 50$	
$0 < L \leq 60$	

(continued on the next page)

Turn over

10. continued.

**(b) Look at the diagram for
Question 10(b) in the
Diagram Book.**

It is a grid.

**Draw a cumulative frequency
graph for your table on the grid.**

(2 marks)

(continued on the next page)

10. continued.

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

(2 marks)

_____ minutes

(continued on the next page)

Turn over

10. continued.

(d) Use your graph to find an estimate for the number of buses that were more than 50 minutes late last Monday.

(2 marks)

(Total for Question 10 is 7 marks)

Turn over

11. (a) Simplify fully

$$(8p^{15})^{\frac{2}{3}}$$

(2 marks)

(continued on the next page)

11. continued.

(b) Express

$$\left(\frac{y}{2}\right)^{-4} \text{ in the form } ay^n$$

where a and n are integers.

(2 marks)

(continued on the next page)

Turn over

11. continued.

(c) Solve

$$\frac{4x - 2}{3} - \frac{5 - 3x}{4} = 6$$

Show clear algebraic working.

(4 marks)

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

11. (c) continued.

X = _____

(Total for Question 11 is 8 marks)

Turn over

12. Given that

$$\frac{3^x}{9^{3x}} = 81$$

find the value of x

Show clear algebraic working.

(3 marks)

Answer space continues on the next page.

Turn over

12. continued.

x = _____

(Total for Question 12 is 3 marks)

Turn over

13. Use algebra to show that

$$0.\dot{6}8\dot{1} = \frac{15}{22}$$

(2 marks)

Answer space continues on the next page.

13. continued.

(Total for Question 13 is 2 marks)

Turn over

14. $\mathcal{E} = \{\text{integers } x \text{ such that}$
 $10 \leq x \leq 25\}$

$$A = \{x : x < 18\}$$

$$B = \{x : 13 \leq x < 22\}$$

(a) Write down $n(A)$

(1 mark)

(continued on the next page)

14. continued.

Remember:

$$\mathcal{E} = \{\text{integers } x \text{ such that } 10 \leq x \leq 25\}$$

$$A = \{x : x < 18\}$$

$$B = \{x : 13 \leq x < 22\}$$

(b) List the members of the set $(A \cup B)'$

(2 marks)

Answer space continues on the next page.

14. (b) continued.

(continued on the next page)

14. continued.

Remember:

$$\mathcal{E} = \{\text{integers } x \text{ such that } 10 \leq x \leq 25\}$$

$$A = \{x : x < 18\}$$

$$B = \{x : 13 \leq x < 22\}$$

- (c) List the members of the set $A' \cap B$**
(2 marks)

Answer space continues on the next page.

14. (c) continued.

(continued on the next page)

14. continued.

Remember:

$$\mathcal{E} = \{\text{integers } x \text{ such that} \\ 10 \leq x \leq 25\}$$

$$A = \{x : x < 18\}$$

$$B = \{x : 13 \leq x < 22\}$$

Given that

$$C \subset A, C \subset B \text{ and } n(C) = 5$$

- (d) List the members of the set **C**
(1 mark)

Answer space continues on the
next page.

Turn over

14. (d) continued.

54

(Total for Question 14 is 6 marks)

Turn over

15. Make y the subject of

$$x = \frac{5 - 2y}{y + 3}$$

(4 marks)

Answer space continues on the next page.

15. continued.

(Total for Question 15 is 4 marks)

Turn over

16. Solve the simultaneous equations

$$3xy - y^2 = 8$$

$$x - 2y = 1$$

Show clear algebraic working.

(5 marks)

Answer space continues on the next three pages.

16. continued.

Turn over

16. continued.

Turn over

16. continued.

(Total for Question 16 is 5 marks)

Turn over

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

It is NOT accurately drawn.

It shows a rectangle PQRS

$$\mathbf{PQ = (2y - 4) \text{ cm}}$$

$$\mathbf{PS = (3y + 2) \text{ cm}}$$

The area of the rectangle is $A \text{ cm}^2$

Given that $A < 3y + 27$

find the range of possible values for y

(5 marks)

Answer space is on the next two pages.

17. continued.

Turn over

17. continued.

(Total for Question 17 is 5 marks)

Turn over

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

You may be provided with a model.

They are NOT accurate.

They show cuboid $ABCDEFGH$

$AB = 5 \text{ cm}$

$AH = 4 \text{ cm}$

The size of the angle between CH and the plane $ABCD$ is 35°

Calculate the volume of the cuboid.

Give your answer correct to

3 significant figures.

(5 marks)

Answer space is on the next two pages.

Turn over

18. continued.

Turn over

18. continued.

_____ **cm³**

(Total for Question 18 is 5 marks)

Turn over

19. **OAB** is a triangle.

$$\overrightarrow{OA} = \underline{a} \qquad \overrightarrow{OB} = \underline{b}$$

The point **C** lies on **OA** such that
OC : CA = 1 : 2

The point **D** lies on **OB** such that
OD : DB = 1 : 2

Using a vector method, prove that
ABDC is a trapezium.

(3 marks)

Answer space continues on the next
two pages.

19. continued.

Turn over

19. continued.

(Total for Question 19 is 3 marks)

Turn over

20. A bag contains X counters.

There are only red counters and blue counters in the bag.

There are 4 more blue counters than red counters in the bag.

Finty takes at random 2 counters from the bag.

The probability that Finty takes 2 blue counters from the bag is $\frac{3}{8}$

Work out the value of X

Show clear algebraic working.

(5 marks)

Answer space is on the next three pages.

20. continued.

Turn over

20. continued.

Turn over

20. continued.

(Total for Question 20 is 5 marks)

Turn over

21. The function f is such that

$$\mathbf{f(x) = 5 + 6x - x^2 \quad \text{for } x \leq 3}$$

- (a) Express $5 + 6x - x^2$
in the form $p - (x - q)^2$
where p and q are constants.
(2 marks)**

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

21. (a) continued.

(continued on the next page)

21. continued.

**(b) Using your answer to part (a),
find the range of values of x
for which $f^{-1}(x)$ is positive.**

(5 marks)

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

21. (b) continued.

21. (b) continued.

(Total for Question 21 is 7 marks)

TOTAL FOR PAPER IS 100 MARKS

END OF PAPER
