

Paper Reference 4MA1/1HR

Pearson Edexcel

International GCSE

Mathematics A

Level 1/2

Paper 1HR

(Calculator)

Higher Tier

Tuesday 21 May 2019 – 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					

Y60260A

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.

ADVICE

Read each question carefully before you start to answer it.

Check your answers if you have time at the end.

Turn over

5

**Answer ALL TWENTY FIVE
questions.**

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

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

Turn over

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

It is NOT accurately drawn.

It shows a cylinder.

The cylinder has radius 8.2 cm and height 10 cm

The cylinder is empty.

Pam pours 1.5 litres of water into the cylinder.

(continued on the next page)

1. continued.

Work out the depth of the water in the cylinder.

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

(3 marks)

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

1. continued.

Turn over

1. continued.

_____ **cm**

(Total for Question 1 is 3 marks)

Turn over

2. Each interior angle of a regular polygon is 162°

Work out the number of sides the polygon has.

(3 marks)

Answer space continues on the next page.

2. continued.

(Total for Question 2 is 3 marks)

Turn over

3. $\mathcal{E} = \{11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

$$A = \{\text{even numbers}\}$$

$$B = \{\text{multiples of 3}\}$$

List the members of the set

(i) $A \cap B$

(continued on the next page)

Turn over

3. continued.

Remember:

$$\mathcal{U} = \{11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$$

$$A = \{\text{even numbers}\}$$

$$B = \{\text{multiples of 3}\}$$

(ii) $A \cup B$

(continued on the next page)

Turn over

3. continued.

Remember:

$$\mathcal{E} = \{11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$$

$$A = \{\text{even numbers}\}$$

$$B = \{\text{multiples of 3}\}$$

(iii) A'

(Total for Question 3 is 3 marks)

Turn over

4. Solve

$$4x - 13 = 17 + 8x$$

X = _____

(Total for Question 4 is 2 marks)

Turn over

5. (a) Write **720** as a product of its prime factors.

Show your working clearly.

(3 marks)

Answer space continues on the next two pages.

5. (a) continued.

Turn over

5. (a) continued.

(continued on the next page)

Turn over

5. continued.

(b) Find the smallest whole number that 720 can be multiplied by to give a square number.

(1 mark)

(Total for Question 5 is 4 marks)

Turn over

6. Lorenzo increases all the prices on his restaurant menu by 8%

Before the increase, the price of a dessert was \$4.25

- (a) Work out the price of the dessert after the increase.

(3 marks)

Answer space continues on the next page.

6. (a) continued.

\$ _____

(continued on the next page)

Turn over

6. continued.

After the increase, the price of lasagne is \$9.45

(b) Work out the price of lasagne before the increase.

(3 marks)

Answer space continues on the next page.

Turn over

6. (b) continued.

\$ _____

(Total for Question 6 is 6 marks)

Turn over

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

It is NOT accurately drawn.

It shows isosceles triangle **ABC**

$$AB = AC = 7.5 \text{ cm}$$

The height of the triangle is 6 cm

Calculate the area of the triangle.

(4 marks)

Answer space continues on the next two pages.

7. continued.

Turn over

7. continued.

_____ cm^2

(Total for Question 7 is 4 marks)

Turn over

8. There are **10** people in a lift.

These **10** people have a mean weight of **79.2 kg**

3 of these people get out of the lift.

These **3** people have a mean weight of **68 kg**

Work out the mean weight of the **7** people left in the lift.

(3 marks)

Answer space continues on the next page.

8. continued.

_____ kg

(Total for Question 8 is 3 marks)

Turn over

9. (a) Simplify

$$t^9 \div t^3$$

(1 mark)

(b) Simplify

$$w^5 \times w^7$$

(1 mark)

(continued on the next page)

Turn over

9. continued.

(c) Simplify

$$(5xy^2)^3$$

(2 marks)

(Total for Question 9 is 4 marks)

Turn over

- 10. Change 22 metres per second to a speed in kilometres per hour.**

Show your working clearly.

(3 marks)

Answer space continues on the next page.

10. continued.

_____ km/h

(Total for Question 10 is 3 marks)

Turn over

11. 3 years ago, the ratio of Tom's age to Clemmie's age was $2:7$
Tom is now 15 years old and
Clemmie is now X years old.

Find the value of X

(3 marks)

Answer space continues on the next
page.

11. continued.

X = _____

(Total for Question 11 is 3 marks)

Turn over

12.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

A box, in the shape of a cuboid, is going to be put on a table.

The whole of one face of the box will be in contact with the table.

The force exerted by the box on the table is always **105** newtons.

The box is **5** metres by **4** metres by **3** metres.

(continued on the next page)

Turn over

12. continued.

The greatest pressure exerted by the box on the table is P newtons/m²

The least pressure exerted by the box on the table is Q newtons/m²

Work out the value of $P - Q$

(3 marks)

Answer space continues on the next two pages.

Turn over

12. continued.

Turn over

12. continued.

(Total for Question 12 is 3 marks)

Turn over

- 13. (a) Look at the diagram for
Question 13(a) in the
Diagram Book.**

**On the Venn diagram, shade the
set $(A \cup B)' \cap C$
(1 mark)**

(continued on the next page)

13. continued.

**(b) Look at the diagram for
Question 13(b) in the
Diagram Book.**

**Use set notation to describe
the shaded region in the Venn
diagram.**

(1 mark)

(Total for Question 13 is 2 marks)

Turn over

14. Each day that Barney goes to college, he either goes by bus or he walks.

The probability that Barney will go to college by bus on any day is 0.3

When Barney goes to college by bus, the probability that he will be late is 0.2

When Barney walks to college, the probability that he will be late is 0.1

(continued on the next page)

14. continued.

**(a) Look at the diagram for
Question 14(a) in the
Diagram Book.**

**Complete the probability tree
diagram.**

**There are five spaces to fill.
(2 marks)**

(continued on the next page)

14. continued.

Barney will go to college on 200 days next year.

(b) Work out an estimate for the number of days Barney will be late for college next year.

(4 marks)

Answer space continues on the next page.

Turn over

14. (b) continued.

(Total for Question 14 is 6 marks)

Turn over

15. The straight line L_1 has equation

$$2y = 6x - 5$$

The straight line L_2 is perpendicular to L_1 and passes through the point $(9, -1)$

Find an equation for L_2

Give your answer in the form

$$ay + bx = c$$

(4 marks)

Answer space continues on the next two pages.

15. continued.

Turn over

15. continued.

(Total for Question 15 is 4 marks)

Turn over

16. A particle **P** is moving along a straight line.

The fixed point **O** lies on this line.

At time **t** seconds, the displacement, **s** metres, of **P** from **O** is given by

$$s = 4t^3 - 6t^2 + 5t$$

At time **t** seconds, the velocity of **P** is **v** m/s

(continued on the next page)

16. continued.

- (a) Find an expression for v in terms of t**
(2 marks)

$v =$ _____

(continued on the next page)

Turn over

16. continued.

**(b) Find the time at which the
acceleration of the particle is
 6 m/s^2**

(3 marks)

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

Turn over

16. (b) continued.

Turn over

16. (b) continued.

_____ seconds

(Total for Question 16 is 5 marks)

Turn over

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

The histogram shows information about the ages of all the passengers travelling on a plane.

No one on the plane is older than 80 years.

45 passengers on the plane are aged between 25 years and 40 years.

(continued on the next page)

17. continued.

- (a) Work out the total number of
passengers on the plane.
(3 marks)**

(continued on the next page)

Turn over

17. continued.

A passenger on the plane is picked at random.

(b) Work out an estimate for the probability that this person is older than 55 years.

(2 marks)

Answer space continues on the next page.

Turn over

17. (b) continued.

(Total for Question 17 is 5 marks)

Turn over

18. (a) Expand and simplify

$$(y + 2)(2y + 3)(y - 7)$$

Show your working clearly.

(3 marks)

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

Turn over

18 (a) continued.

(continued on the next page)

Turn over

18. continued.

(b) Make m the subject of

$$p^2 = \frac{t + m}{2m - y}$$

(3 marks)

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

Turn over

18. (b) continued.

(Total for Question 18 is 6 marks)

Turn over

19. The 25th term of an arithmetic series is 44.5

The sum of the first 30 terms of this arithmetic series is 765

Find the 16th term of the arithmetic series.

Show your working clearly.

(5 marks)

Answer space continues on the next three pages.

19. continued.

Turn over

19. continued.

Turn over

19. continued.

(Total for Question 19 is 5 marks)

Turn over

20.

$a = 25 \times 10^{14n}$ where n is an integer.

Find an expression, in terms of n ,

for $a^{\frac{3}{2}}$

Give your answer in standard form.

(3 marks)

Answer space continues on the next two pages.

Turn over

20. continued

Turn over

20. continued

(Total for Question 20 is 3 marks)

Turn over

21. A curve has equation $y = f(x)$

There is only one maximum point on the curve.

The coordinates of this maximum point are (4, 3)

(continued on the next page)

21. continued

(a) Write down the coordinates of the maximum point on the curve with equation

(i) $y = f(x - 5)$

(_____ , _____)

(ii) $y = 3f(x)$

(_____ , _____)

(2 marks)

(continued on the next page)

Turn over

21. continued.

**Look at the diagram for Question 21(b)
in the Diagram Book.**

**It shows the graph of $y = a \sin(bx)^\circ$
for $0 \leq x \leq 360$**

**(b) Find the value of a and the value
of b**

(2 marks)

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

Turn over

21. (b) continued

a = _____

b = _____

(Total for Question 21 is 4 marks)

Turn over

22. Solve the simultaneous equations

$$2x^2 + 3y^2 = 5$$

$$y = 2x + 1$$

Show clear algebraic working.

(5 marks)

Answer space continues on the next three pages.

Turn over

22. continued.

Turn over

22. continued.

Turn over

22. continued.

(Total for Question 22 is 5 marks)

Turn over

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

It is NOT accurately drawn.

B, C, D and F are points on a circle.

ABC, AFD, BFE and CDE are straight lines.

Angle BAF = 54°

Angle FED = 32°

Angle CBF is marked x

Work out the size of the angle marked x

Show your working clearly.

(4 marks)

Answer space is on the next two pages.

Turn over

23. continued.

Turn over

23. continued.

$$X = \text{_____}^{\circ}$$

(Total for Question 23 is 4 marks)

Turn over

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

It is NOT accurately drawn.

$$\overrightarrow{OA} = \underline{a}$$

$$\overrightarrow{OC} = \underline{c}$$

$$\overrightarrow{AB} = 2\underline{c}$$

P is the point on AB such that

$$AP : PB = 3 : 1$$

Q is the point on AC such that OQP is a straight line.

(continued on the next page)

Turn over

24. continued.

Use a vector method to find $AQ : QC$

Show your working clearly.

(5 marks)

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

Turn over

24. continued.

Turn over

24. continued.

AQ : QC = _____

(Total for Question 24 is 5 marks)

Turn over

**25. A boat sails from point X to point Y
and then to point Z**

Y is on a bearing of 280° from X

Z is on a bearing of 220° from Y

The distance from X to Y is 3.5 km

The distance from Y to Z is 6 km

Work out the bearing of Z from X

Give your answer correct to

1 decimal place.

(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 100 MARKS

END OF PAPER
