

U68796A UEB

Print copy of Braille transcript

Pearson Edexcel International GCSE

Paper reference 4MA1/1H

Mathematics A

Paper 1H

Higher Tier

Time: 2 hours

**YOU MUST HAVE:** Calculator, tactile ruler and protractor, compasses and drawing equipment e.g. geometry board, rubber mat, mapping pins, rubber bands, drawing stylus and spur wheel.

**YOU WILL BE GIVEN**

- Separate Diagram Booklet.
- Separate Formulae Booklet.
- Models for Question 7 and Question 22.

**INSTRUCTIONS**

- **On your paper, write** your name, your centre number and candidate number.
- Answer ALL questions.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions **on your paper**.
- **CALCULATORS MAY BE USED.**
- You must **NOT** write anything on the formulae **booklet**. Anything you write on the formulae **booklet** will gain **NO** credit.

**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.

**ADVICE**

- Read each question carefully before you start to answer it.
  - Check your answers if you have time at the end.
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Answer ALL TWENTY FOUR questions.

Write your answers **on your paper**.

You must write down all the stages in your working.

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1. **The numbers below** are the first five terms of an arithmetic sequence.

1   5   9   13   17

(a) Find an expression, in terms of  $n$ , for the  $n$ th term of this sequence.

**Ans: \_\_\_\_ [2 marks]**

(b) The  $n$ th term of another arithmetic sequence is  $3n + 5$

Find an expression, in terms of  $m$ , for the  $(2m)$ th term of this sequence.

**Ans: \_\_\_\_ [1 mark]**

(Total for Question 1 is 3 marks)

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2. **Look at the diagram for Question 2 in the separate Diagram Booklet.**

**The diagram shows the plan view of a biased 4-sided spinner.**

The table **below** gives the probabilities that, when the spinner is spun once, it will land on 1 or it will land on 3

Number	Probability
1	0.26
2	
3	0.18
4	

The probability that the spinner will land on 2 is equal to the probability that the spinner will land on 4

Ravina is going to spin the spinner a number of times.

Ravina works out that an estimate for the number of times the spinner will land on 3 is 45

Work out an estimate for the number of times the spinner will land on 4

**Ans: \_\_\_\_**

(Total for Question 2 is 4 marks)

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3. (a) Find the highest common factor (HCF) of 56 and 84  
Show your working clearly.

Ans: \_\_\_\_ [2 marks]

(b) Find the lowest common multiple (LCM) of 60 and 72  
Show your working clearly.

Ans: \_\_\_\_ [2 marks]

(Total for Question 3 is 4 marks)

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4. Look at the diagram for Question 4 in the separate Diagram Booklet.

The diagram is NOT accurately drawn.

The diagram shows parts of three regular polygons, A, B and C, meeting at a point.

In the diagram:

the internal angle of polygon A =  $8x^\circ$

the internal angle of polygon B =  $7x^\circ$

the internal angle of polygon C =  $3x^\circ$

Polygon B has  $n$  sides.

Work out the value of  $n$ .

Ans:  $n =$  \_\_\_\_

(Total for Question 4 is 4 marks)

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5. (a) Expand and simplify  $(n - 6)(n + 4)$

Ans: \_\_\_\_ [2 marks]

(b) Solve  $2x - 3 = \frac{3x - 5}{4}$

Show clear algebraic working.

Ans:  $x =$  \_\_\_\_ [3 marks]

(Total for Question 5 is 5 marks)

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6. Asha bought an apartment.

The table below gives information about the value of apartments, in euros, and the annual service charge band.

Value (x euros)	Service charge band
$x \geq 700,000$	A
$600,000 \leq x < 700,000$	B
$500,000 \leq x < 600,000$	C
$400,000 \leq x < 500,000$	D
$0 < x < 400,000$	E

In 2021, the value of Asha's apartment was 634,400 euros.

The value of Asha's apartment had increased by 4% from its value in 2020

(a) Has the annual service charge band changed for Asha's apartment?  
Show your working clearly.

Ans: \_\_\_ [3 marks]

(b) Pam bought a boat.

In each year after Pam bought the boat, the value of the boat depreciated by 15%

Work out the total percentage by which the value of the boat had depreciated by the end of the second year after Pam bought the boat.

Ans: \_\_\_% [3 marks]

(Total for Question 6 is 6 marks)

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7. Ask for the model for Question 7. The model is NOT accurate.  
 The model is a cylinder.  
 The cylinder is placed on the ground.

The height of the cylinder is 18 cm.

The force exerted by the cylinder on the ground is 72 newtons.  
 The pressure on the ground due to the cylinder is 1.4 newtons/cm<sup>2</sup>

Using the formula below,

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

work out the volume of the cylinder.  
 Give your answer correct to 3 significant figures.

Ans: \_\_\_\_ cm<sup>3</sup>

(Total for Question 7 is 4 marks)

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8. (a) Write 0.000089 in standard form.

Ans: \_\_\_\_ [1 mark]

(b) Write  $8.34 \times 10^4$  as an ordinary number.

Ans: \_\_\_\_ [1 mark]

(Total for Question 8 is 2 marks)

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9. (a) Simplify  $8 \times (4t)^0$

Ans: \_\_\_\_ [1 mark]

(b) Given that

$$y^6 \div y^{-5} = y^p$$

Find the value of p

Ans: p = \_\_\_\_ [1 mark]

(c) Simplify fully  $(2k^2 m^4)^3$

Ans: \_\_\_\_ [2 marks]

(Total for Question 9 is 4 marks)

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10. Two circles,  $C_1$  and  $C_2$ , are drawn on a centimetre grid, with a scale of 1 cm for 1 unit on each axis.

The centre of circle  $C_1$  is at the point with coordinates  $(-1, 3)$  and the radius of  $C_1$  is 13 cm.

The centre of circle  $C_2$  is at the point with coordinates  $(7, 18)$  and the radius of  $C_2$  is 6 cm.

(a) Work out the distance between the centre of  $C_1$  and the centre of  $C_2$

Ans: \_\_\_\_ cm [3 marks]

(b) Explain why circle  $C_1$  intersects circle  $C_2$

Ans: \_\_\_\_ [1 mark]

(Total for Question 10 is 4 marks)

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11. (a) Factorise  $9x^2 - 4y^2$

Ans: \_\_\_\_ [2 marks]

(b) Express  $\frac{7}{8} - \frac{y+3}{4y}$  as a single fraction in its simplest form.

Ans: \_\_\_\_ [3 marks]

(Total for Question 11 is 5 marks)

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12. Look at the diagram for Question 12 in the separate Diagram Booklet.  
The diagram shows an incomplete probability tree diagram.

Rudolf goes to the gym.

The probability that he will use the treadmill is 0.8

When he uses the treadmill, the probability that he will use the cross trainer is 0.3  
When he does NOT use the treadmill, the probability that he will use the cross trainer is 0.6

(a) Complete the probability tree diagram for this information.

Ans: (i) \_\_\_ (ii) \_\_\_ (iii) \_\_\_ (iv) \_\_\_ (v) \_\_\_ (vi) \_\_\_ [2 marks]

(b) Work out the probability that Rudolf uses both the treadmill and the cross trainer.

Ans: \_\_\_ [2 marks]

(Total for Question 12 is 4 marks)

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13. Antoine is going on holiday.

He makes 3 separate payments to cover the total cost of his holiday.

The table below shows how much money Antoine pays to the holiday company.

Payment	Amount paid
Payment 1	$\frac{3}{8}$ of the total cost
Payment 2	45% of the total cost
Payment 3	\$406

Work out how much Antoine has to pay for Payment 2

Ans: \$\_\_\_

(Total for Question 13 is 5 marks)

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14. The function  $f$  is defined as

$$f : x \mapsto \frac{2x}{x - 6} \quad x \neq 6$$

(a) Find  $f(10)$

Ans: \_\_\_\_ [1 mark]

(b) Express the inverse function  $f^{-1}$  in the form  $f^{-1} : x \mapsto \dots$

Ans:  $f^{-1} : x \mapsto$  \_\_\_\_ [3 marks]

(Total for Question 14 is 4 marks)

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15. Abraham is going to play a computer game.

Abraham can win the game, draw the game or lose the game.

For any game that Abraham plays

the probability that he wins the game is 0.3

the probability that he draws the game is 0.5

the probability that he loses the game is 0.2

When Abraham wins a game, he scores +10 points.

When Abraham draws a game, he scores 0 points.

When Abraham loses a game, he scores -5 points.

Abraham plays 3 games and the points he scores in each of the 3 games are added together to get his total score.

Work out the probability that when he has played 3 games his total score is 0 points.

Ans: \_\_\_\_

(Total for Question 15 is 4 marks)

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16. Without using a calculator, show that  $\frac{12}{\sqrt{2} - 1} - (\sqrt{2})^5 = 2\sqrt{32} + 12$

Show your working clearly.

Ans: \_\_\_\_

(Total for Question 16 is 3 marks)

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17. A particle P moves along a straight line.  
The fixed point O lies on this line.

The displacement of P from O at time  $t$  seconds,  $t \geq 1$ , is  $s$  metres where

$$s = 4t^2 + \frac{125}{t}$$

The velocity of P at time  $t$  seconds,  $t \geq 1$ , is  $v$  m/s

Work out the distance of P from O at the instant when  $v = 0$

Ans: \_\_\_\_ m

(Total for Question 17 is 5 marks)

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18. Look at the diagram for Question 18 in the separate Diagram Booklet.  
The diagram is NOT accurately drawn.  
The diagram shows triangle ABC

In the diagram:

$$AB = 9.7 \text{ m}$$

$$BC = 12.3 \text{ m}$$

$$\text{Angle } ABC = 115^\circ$$

$$\text{Angle } BCA = x^\circ$$

Work out the value of  $x$

Give your answer correct to 3 significant figures.

Ans:  $x =$  \_\_\_\_

(Total for Question 18 is 5 marks)

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19. Look at the diagram for Question 19 in the separate Diagram Booklet.  
The diagram is NOT accurately drawn.

OAB is a sector S of a circle with centre O and radius  $(r + 7)$  metres.

Angle AOB =  $45^\circ$

A circle C has radius  $(r - 2)$  metres.

The area of sector S is twice the area of circle C

Find the value of  $r$

Show your working clearly.

Ans:  $r = \underline{\hspace{2cm}}$

(Total for Question 19 is 5 marks)

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20. Look at the diagram for Question 20 in the separate Diagram Booklet.

The diagram shows a sketch of part of the curve with equation  $y = f(x)$

There is one maximum point on this curve.

The coordinates of this maximum point are  $(s, t)$

Find, in terms of  $s$  and  $t$ , the coordinates of the maximum point on the curve with equation

(i)  $y = f(x - 2)$

Ans:  $(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$  [1 mark]

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

Ans:  $(\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$  [1 mark]

(Total for Question 20 is 2 marks)

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21. Look at the diagram for Question 21 in the separate Diagram Booklet.

The diagram is a histogram.

The histogram shows information about the total time,  $m$  minutes, taken by each child in a school to walk to school every day for one week.

There are no children for whom  $m > 100$

There are 10 children for whom  $m \leq 20$

Work out an estimate for the number of children for whom  $50 < m \leq 80$

Ans:  $\underline{\hspace{2cm}}$

(Total for Question 21 is 3 marks)

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22. Ask for the model for Question 22. The model is NOT accurate.  
The model is a solid made from a cone and a hemisphere.

Look at the diagram for Question 22 in the separate Diagram Booklet.  
The diagram is NOT accurately drawn.  
The diagram shows a 2-D side view of the solid.

The circular plane face of the hemisphere coincides with the circular base of the cone.

The radius of the hemisphere and the radius of the circular base of the cone are both 20 cm.

The curved surface area of the cone is  $580\pi \text{ cm}^2$

The volume of the solid is  $k\pi \text{ cm}^3$

Work out the exact value of  $k$

Ans:  $k = \underline{\hspace{2cm}}$

(Total for Question 22 is 5 marks)

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23. A polygon has  $n$  sides, where  $n > 5$

When arranged in order of size, starting with the largest number, the sizes of the interior angles of the polygon, in degrees, are the terms of an arithmetic sequence.

Here are the first five terms of this sequence.

177   175   173   171   169

Find the value of  $n$

Show clear algebraic working.

Ans:  $n = \underline{\hspace{2cm}}$

(Total for Question 23 is 6 marks)

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24. Express each of a, b and c in terms of q so that

$$q + 12x - qx^2$$

can be written as  $a - b(x - c)^2$

Ans: a = \_\_\_\_

Ans: b = \_\_\_\_

Ans: c = \_\_\_\_

(Total for Question 24 is 4 marks)

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TOTAL FOR PAPER IS 100 MARKS

**END OF PAPER**

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