

Paper Reference 4MA1/1HR  
Pearson Edexcel  
International GCSE

Total Marks
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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					

## **YOU MUST HAVE**

**Ruler, protractor, compasses, writing and drawing equipment, calculator. Tracing paper may be used.**

## **YOU WILL BE GIVEN**

**Diagram Book  
Formulae Pages**

## **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.**

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**Answer ALL TWENTY FIVE questions.**

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

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

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  $8.2\text{ cm}$  and height  $10\text{ cm}$

The cylinder is empty.

Pam pours  $1.5$  litres of water into the cylinder.

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 page.

1. continued.

\_\_\_\_\_ cm

(Total for Question 1 is 3 marks)

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Turn over

2. Each interior angle of a regular polygon is  $162^\circ$

Work out the number of sides the polygon has.

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(Total for Question 2 is 3 marks)

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Turn over

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

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

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

List the members of the set

(i)  $A \cap B$

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(continued on the next page)



3. continued.

(ii)  $A \cup B$

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(iii)  $A'$

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(Total for Question 3 is 3 marks)

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Turn over

4. Solve

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

**x** = \_\_\_\_\_

(Total for Question 4 is 2 marks)

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5. (a) Write **720** as a product of its prime factors.  
Show your working clearly.  
(3 marks)

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

5. (a) continued.

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(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)

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(Total for Question 5 is 4 marks)

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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)

\$ \_\_\_\_\_

(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)**

**\$ \_\_\_\_\_**

**(Total for Question 6 is 6 marks)**

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**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 page.



7. continued.

\_\_\_\_\_  $\text{cm}^2$

(Total for Question 7 is 4 marks)

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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)

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9. (a) Simplify  
 $t^9 \div t^3$   
(1 mark)
- 

- (b) Simplify  
 $w^5 \times w^7$   
(1 mark)
- 

(continued on the next page)

9. continued.

(c) Simplify  
 $(5xy^2)^3$   
(2 marks)

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(Total for Question 9 is 4 marks)

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

Show your working clearly.

\_\_\_\_\_ km/h

(Total for Question 10 is 3 marks)

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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)

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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**.

The greatest pressure exerted by the box on the table is **P newtons/m<sup>2</sup>**

The least pressure exerted by the box on the table is **Q newtons/m<sup>2</sup>**

Work out the value of **P – Q**

(3 marks)

Answer space is on the next two pages.

Turn over

12. continued.

Turn over

12. continued.

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**(Total for Question 12 is 3 marks)**

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**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)

(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)

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(Total for Question 13 is 2 marks)

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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  $0.1$

- (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)**

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**(Total for Question 14 is 6 marks)**

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**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 page.

15. continued.

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**(Total for Question 15 is 4 marks)**

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**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

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

$$v = \underline{\hspace{4cm}}$$

(continued on the next page)

Turn over

**16. continued.**

**(b) Find the time at which the acceleration of the particle is  $6 \text{ m/s}^2$**

**(3 marks)**

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

16. (b) continued.

\_\_\_\_\_ seconds

(Total for Question 16 is 5 marks)

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**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.**

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

**(3 marks)**

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**(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)**

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**(Total for Question 17 is 5 marks)**

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**Turn over**

18. (a) Expand and simplify

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

Show your working clearly.

(3 marks)

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(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.

18. (b) continued.

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(Total for Question 18 is 6 marks)

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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 two pages.

19. continued.

19. continued.

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(Total for Question 19 is 5 marks)

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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 page.

**20. continued**

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**(Total for Question 20 is 3 marks)**

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**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  $(4, 3)$

(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)**

**$a =$  \_\_\_\_\_**

**$b =$  \_\_\_\_\_**

**(Total for Question 21 is 4 marks)**

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**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 two pages.**



**22. continued.**

**Turn over**

**22. continued.**

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**(Total for Question 22 is 5 marks)**

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**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 =  $54^\circ$**

**Angle FED =  $32^\circ$**

**Angle CBF is marked  $x$**

**Work out the size of the angle marked  $x$**

**Show your working clearly.**

**(4 marks)**

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

23. continued.

$$x = \underline{\hspace{10em}}^{\circ}$$

(Total for Question 23 is 4 marks)

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Turn over

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

It is NOT accurately drawn.

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

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

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

**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.

Use a vector method to find **AQ : QC**

Show your working clearly.

(5 marks)

Answer space continues on the next page.

24. continued.

**AQ : QC = \_\_\_\_\_**

**(Total for Question 24 is 5 marks)**

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**Turn over**

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

**$Y$  is on a bearing of  $280^\circ$  from  $X$**

**$Z$  is on a bearing of  $220^\circ$  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 continues on the next two pages.**

25. continued.

Turn over



25. continued.

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(Total for Question 25 is 5 marks)

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**TOTAL FOR PAPER IS 100 MARKS**

**END OF PAPER**

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