

**Paper Reference 4MA1/1HR  
Pearson Edexcel  
International GCSE**

Total Marks

# **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.**

<b>Surname</b>					
<b>Other names</b>					
<b>Centre Number</b>					
<b>Candidate Number</b>					

**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.**

## **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.

---

**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  $8.2$  cm and height  $10$  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)**

---

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

Work out the number of sides the polygon has.

---

(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)

3. continued.

(ii)  $A \cup B$

---

(iii)  $A'$

---

(Total for Question 3 is 3 marks)

---

4. Solve

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

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

**(Total for Question 4 is 2 marks)**

---

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.



(continued on the next page)

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)**

---

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)**

---

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)

---

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)

---

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)

---

(Total for Question 9 is 4 marks)

---

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)

---

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)

---

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.

12. continued.

12. continued.

---

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

---

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)

---

(Total for Question 13 is 2 marks)

---

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)

---

(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 page.

15. continued.

---

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

---

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)

$$v = \underline{\hspace{10em}}$$

(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)

---

**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)**

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)

---

(Total for Question 17 is 5 marks)

---

18. (a) Expand and simplify

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

Show your working clearly.

(3 marks)

---

(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.

---

**(Total for Question 18 is 6 marks)**

---

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.

---

**(Total for Question 19 is 5 marks)**

---

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

---

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

---

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)

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)

---

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.

22. continued.

---

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

---

**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.

$x =$  \_\_\_\_\_  $\circ$

(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.

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

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

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

**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)**

---

**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.

25. continued.

○

---

(Total for Question 25 is 5 marks)

---

**TOTAL FOR PAPER IS 100 MARKS**

**END OF PAPER**

---