

**Paper Reference 4MA1/2H**  
**Pearson Edexcel**  
**International GCSE**

Total Marks
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**Mathematics A**  
**PAPER 2H**  
**Higher Tier**  
**(Calculator)**

**Time: 2 hours**

**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 Booklet  
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 in case you need them.**

**You may be provided with a model for Question 23**

## **ADVICE**

**Read each question carefully before you start to answer it.**

**Check your answers if you have time at the end.**

**5**

**Answer ALL TWENTY SIX  
questions.**

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

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

**Turn over**

1. Show that

$$3\frac{5}{7} \div 1\frac{5}{8} = 2\frac{2}{7}$$

(3 marks)

Answer space continues on the next page.

Turn over

**1. continued.**

**(Total for Question 1 is 3 marks)**

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**Turn over**

2. Change a speed of **90** kilometres per hour to a speed in metres per second. Show your working clearly.

(3 marks)

Answer space continues on the next page.



**2. continued.**

\_\_\_\_\_ m/s

**(Total for Question 2 is 3 marks)**

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**Turn over**

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

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

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

$$A \cap B = \{12, 16, 20\}$$

$$(A \cup B)' = \{17, 19\}$$

Complete the Venn diagram in the Diagram Booklet for the sets  $\mathcal{E}$ ,  $A$  and  $B$

(Total for Question 3 is 3 marks)

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Turn over

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

It is NOT accurately drawn.

It shows rectangle **ABCD**

$$AB = 24 \text{ cm}$$

$$BC = (3y + 7 \cdot 4) \text{ cm}$$

$$AD = (5y - 1) \text{ cm}$$

Work out the perimeter of the rectangle.

Show your working clearly.

(4 marks)

Answer space continues on the next two pages.

Turn over

4. continued.

Turn over

**4. continued.**

\_\_\_\_\_ **cm**

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

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**Turn over**

5. The weight of a cake is  $2.75$  kg, correct to 2 decimal places.

- (a) Write down the lower bound of the weight of the cake.  
(1 mark)

\_\_\_\_\_ kg

(continued on the next page)

Turn over

**5. continued.**

**(b) Write down the upper bound of  
the weight of the cake.**

**(1 mark)**

\_\_\_\_\_ **kg**

**(continued on the next page)**

**Turn over**

5. continued.

Penny has worked out

$$\frac{81.3 \times 59.2}{1.9^2} \text{ on her calculator.}$$

Her answer is

**13 332.299 17**

**Penny's answer is not sensible.**

**(continued on the next page)**

**Turn over**



**5. continued.**

**(c) By rounding each number to one significant figure, work out a suitable estimate to show that her answer is not sensible.**

**Show your working clearly.**

**(2 marks)**

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

**Turn over**

**5. (c) continued.**

**(Total for Question 5 is 4 marks)**

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**Turn over**

6. The points **A** and **B** are on a coordinate grid.

The coordinates of **A** are **(6, 4)**

The coordinates of **B** are **(17, r)**

where **r** is a constant.

The midpoint of **AB** has coordinates **(k, 15)** where **k** is a constant.

Find the value of **r** and the value of **k**

**(3 marks)**

Answer space continues on the next page.

Turn over

**6. continued.**

**r =** \_\_\_\_\_

**k =** \_\_\_\_\_

**(Total for Question 6 is 3 marks)**

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**Turn over**

**7. Solve the simultaneous equations**

$$5x + 4y = -2$$

$$2x - y = 4.4$$

**Show clear algebraic working.**

**(3 marks)**

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

**Turn over**

7. continued.

Turn over

**7. continued.**

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

**y =** \_\_\_\_\_

**(Total for Question 7 is 3 marks)**

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**Turn over**

- 8. Look at the information for Question 8 in the Diagram Booklet. Matteo is going to invest 5000 Swiss francs for two years.**

**He can invest his money in Bank G or in Bank H**

**The interest rates for these banks are shown in the Diagram Booklet.**

**(continued on the next page)**



8. continued.

The total amount of interest Matteo would receive at the end of two years from Bank **G** is more than the amount of interest Matteo would receive at the end of two years from Bank **H**

How much more?

(4 marks)

Answer space continues on the next two pages.

Turn over

8. continued.

Turn over

**8. continued.**

\_\_\_\_\_ **Swiss francs**

**(Total for Question 8 is 4 marks)**

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**Turn over**

9. (a) Write down the value of  $(m + 2)^0$  where  $m$  is a positive integer.  
(1 mark)
- 

(continued on the next page)

**9. continued.**

**(b) Simplify**  
 **$(3p^2q^4)^3$**   
**(2 marks)**

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**(continued on the next page)**

**Turn over**

**9. continued.**

**(c) Factorise fully**

$$14x^2y^4 + 21x^3y^2$$

**(2 marks)**

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**(continued on the next page)**

**Turn over**

**9. continued.**

**Look at the diagram for  
Question 9(d) in the Diagram Booklet.  
It shows a straight line drawn on  
a grid.**

**(continued on the next page)**

**9. continued.**

**(d) Write down an equation of the line.**

**(2 marks)**

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**(Total for Question 9 is 7 marks)**

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**Turn over**



**10. Look at the diagram for Question 10 in the Diagram Booklet.**

**It is NOT accurately drawn.**

**It shows an isosceles triangle, with base length 24 cm**

**The perimeter of the triangle is 54 cm**

**Work out the area of the triangle.**

**(5 marks)**

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

10. continued.

Turn over

10. continued.

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

(Total for Question 10 is 5 marks)

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Turn over

**11. Look at the diagram for Question 11  
in the Diagram Booklet.**

**There are six graphs.**

**(continued on the next page)**

11. continued.

Complete the table below with the letter of the graph that could represent each given equation.

Write your answers on the lines.

There are three spaces to fill.

Equation	Graph
$y = -\frac{2}{x}$	_____
$y = 5 - x^2$	_____
$y = -2x^3$	_____

(Total for Question 11 is 3 marks)

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Turn over

**12. Look at the diagram for Question 12 in the Diagram Booklet.**

**The cumulative frequency graph gives information about the time, in minutes, each of 60 people took to shop in a market.**

**(a) Use the graph to find an estimate for the median time people took to shop in the market.**

**(1 mark)**

**\_\_\_\_\_ minutes**

**(continued on the next page)**

**Turn over**

**12. continued.**

**(b) Use the graph to find an estimate for the number of people who took longer than 55 minutes to shop in the market.**

**(2 marks)**

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**(continued on the next page)**

**Turn over**

**12. continued.**

**(c) Use the graph to complete the frequency table on the following page, to give information about the time, in minutes, each of the 60 people took to shop in the market.**

**(2 marks)**

**(continued on the next page)**

**Turn over**



12. (c) continued.

<b>Time taken to shop in the market (m minutes)</b>	<b>Frequency</b>
<b><math>0 &lt; m \leq 10</math></b>	<b>3</b>
<b><math>10 &lt; m \leq 20</math></b>	<b>5</b>
<b><math>20 &lt; m \leq 30</math></b>	
<b><math>30 &lt; m \leq 40</math></b>	
<b><math>40 &lt; m \leq 50</math></b>	
<b><math>50 &lt; m \leq 60</math></b>	
<b><math>60 &lt; m \leq 70</math></b>	

(Total for Question 12 is 5 marks)

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Turn over

**13. Solve**

$$\frac{y + 3}{4} - \frac{7 - y}{5} = 4 \cdot 3$$

**Show clear algebraic working.**

**(3 marks)**

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

**Turn over**

**13. continued.**

**$y =$  \_\_\_\_\_**

**(Total for Question 13 is 3 marks)**

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**Turn over**

**14. Look at the diagram for Question 14 in the Diagram Booklet.**

**It is NOT accurately drawn.**

**It shows a circle.**

**A, B, C and D are points on the circle, centre O**

**EBF is the tangent to the circle at B**

**Angle DAB =  $40^\circ$**

**Angle ABF =  $66^\circ$**

**(continued on the next page)**

**14. continued.**

- (a) (i) Work out the size of angle  
DCB  
(1 mark)**

\_\_\_\_\_o

**(continued on the next page)**

**Turn over**

**14. (a) continued.**

**(ii) Give a reason for your  
answer to (a)(i)  
(1 mark)**

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**(continued on the next page)**

**Turn over**

**14. continued.**

**(b) Work out the size of angle ADO**  
**(3 marks)**

o

**(Total for Question 14 is 5 marks)**

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**Turn over**

- 15. Look at the information for Question 15 in the Diagram Booklet. The information is about two cricket teams, **A** and **B****

**Using a suitable calculation, write down one comparison between the numbers of runs scored by the members of cricket team **A** and the members of cricket team **B****

**Show your working clearly.**

**(3 marks)**

**Answer space and lines continue on the next two pages.**



**15. continued.**

**Turn over**

**15. continued.**

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**(Total for Question 15 is 3 marks)**

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**Turn over**

16. Use algebra to show that

$$0.\dot{4}\dot{3}\dot{8} = \frac{217}{495}$$

(2 marks)

Answer space continues on the next page.

Turn over

**16. continued.**

**(Total for Question 16 is 2 marks)**

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**Turn over**

17. Given that

$$8\sqrt{m} + \sqrt{49m} - \sqrt{9m} = k\sqrt{m}$$

where  $k$  is an integer and  $m$  is a prime number,

- (a) work out the value of  $k$   
(1 mark)

$k =$  \_\_\_\_\_

(continued on the next page)

Turn over

**17. continued.**

**(b) Show that**

$$\frac{5 - \sqrt{18}}{1 - \sqrt{2}}$$

**can be written in the form**

$$a + b\sqrt{2}$$

**where  $a$  and  $b$  are integers.**

**Show each stage of your working  
clearly.**

**(3 marks)**

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

**Turn over**

**17. (b) continued.**

**Turn over**

**17. (b) continued.**

**(Total for Question 17 is 4 marks)**

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**Turn over**



18. The table below gives information about the weights, in kg, of the parcels that Pedro delivers on Monday.

Weight (w kg)	Frequency
$0 < w \leq 2$	12
$2 < w \leq 3$	7
$3 < w \leq 6$	15
$6 < w \leq 9$	12
$9 < w \leq 14$	10

(continued on the next page)

Turn over

**18. continued.**

**Look at the diagram for Question 18(a)  
in the Diagram Booklet.**

**It shows a grid.**

- (a) On the grid in the  
Diagram Booklet, draw a  
histogram for this information.  
(3 marks)**

**(continued on the next page)**

**Turn over**

**18. continued.**

**One of the parcels that Pedro delivered on Monday is chosen at random.**

- (b) Using the information in the table on page 57, find an estimate for the probability that this parcel weighs more than 7 kg  
(2 marks)**

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**(Total for Question 18 is 5 marks)**

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**Turn over**

19. Vase **A** and vase **B** are two similar vases.

Vase **A** is larger than vase **B**

The vases are such that

surface area of vase **B** =

$$\frac{25}{64} \times \text{surface area of vase A}$$

and that

$$\text{volume of vase A} - \text{volume of vase B} = 541.8 \text{ cm}^3$$

(continued on the next page)

Turn over

**19. continued.**

**Calculate the volume of vase B**

**(4 marks)**

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

**Turn over**

**19. continued.**

\_\_\_\_\_ **cm<sup>3</sup>**

**(Total for Question 19 is 4 marks)**

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**Turn over**

**20. Solve the simultaneous equations**

$$y = 7 - 2x$$

$$x^2 + y^2 = 34$$

**Show clear algebraic working.**

**(5 marks)**

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

**Turn over**

**20. continued.**

**Turn over**



**20. continued.**

**Turn over**

**20. continued.**

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**(Total for Question 20 is 5 marks)**

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**Turn over**

21. Given that the surface area of a sphere is  $49\pi \text{ cm}^2$

find the volume of the sphere.

Give your answer correct to the nearest integer.

(3 marks)

Answer space continues on the next page.

**21. continued.**

\_\_\_\_\_ **cm<sup>3</sup>**

**(Total for Question 21 is 3 marks)**

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**Turn over**

**22. Solve the inequality**

$$6x^2 + 37x \leq 35$$

**Show clear algebraic working.**

**(3 marks)**

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

**22. continued.**

**Turn over**

**22. continued.**

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**(Total for Question 22 is 3 marks)**

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**Turn over**

**23. Look at the diagrams for Question 23 in the Diagram Booklet.**

**You may be provided with a model.**

**They are NOT accurate.**

**Diagram 1 and the model show a solid prism **ABCDEFGHIJ****

**Diagram 2 shows the face **FGHIJ** of the prism.**

**(continued on the next page)**



**23. continued.**

The prism is such that each cross section is a pentagon where

$$\mathbf{AE = BC = x \text{ cm}}$$

$$\mathbf{AB = 2x \text{ cm}}$$

$$\mathbf{ED = CD = 8 \text{ cm}}$$

$$\text{angle } \mathbf{EAB} = \text{angle } \mathbf{CBA} = 90^\circ$$

$$\text{angle } \mathbf{AED} = \text{angle } \mathbf{BCD} = 120^\circ$$

**(continued on the next page)**

**Turn over**

**23. continued.**

**Given that**

$$\mathbf{AG = BH = EF = DJ = CI = 12 \text{ cm}}$$

**calculate the angle that AJ makes  
with the base ABHG of the prism.**

**Give your answer correct to  
3 significant figures.**

**(5 marks)**

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

**Turn over**

**23. continued.**

**Turn over**

**23. continued.**

**Turn over**

**23. continued.**

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**(Total for Question 23 is 5 marks)**

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**Turn over**

**24. Look at the diagram for Question 24 in the Diagram Booklet.**

**The graph of**

**$y = a \sin x^\circ + b$  is drawn on the grid in the Diagram Booklet.**

**Find the value of  $a$  and the value of  $b$**

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

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

**(Total for Question 24 is 2 marks)**

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**Turn over**

25. The function  $f$  is such that

$$f(x) = 3x^2 - 12x + 7 \quad \text{where } x \leq 2$$

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

(4 marks)

Answer space continues on the next  
three pages.

**25. continued.**

**Turn over**



**25. continued.**

**Turn over**

25. continued.

$$f^{-1}(x) = \underline{\hspace{10cm}}$$

(Total for Question 25 is 4 marks)

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Turn over

26. Find the values of  $n$  such that

$$\frac{10^{4n} \times 2^{3(n^2-5n)} \times 5^{2(1-2n)}}{20^2} = 1$$

Show clear algebraic working.

(5 marks)

Answer space continues on the next three pages.

Turn over

**26. continued.**

**Turn over**

**26. continued.**

**Turn over**

**26. continued.**

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**(Total for Question 26 is 5 marks)**

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**TOTAL FOR PAPER IS 100 MARKS**

**END OF PAPER**

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