

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

Total Marks

**Mathematics A**

**Level 1/2**

**Paper 1H**

**(Calculator)**

**Higher Tier**

**Monday 7 January 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>					

**X59017A**

## **YOU MUST HAVE**

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

## **YOU WILL BE GIVEN**

**Diagram Book**

**Formulae Pages**

**Shapes for Question 2(a), 2(b) and 2(c)**

## **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.**

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**Answer ALL TWENTY ONE questions.**

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

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

1. (a) Factorise fully  
 $4p + 6pq$   
(2 marks)

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(continued on the next page)

1. continued.

(b) Expand and simplify

$$(e + 3)(e - 5)$$

(2 marks)

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(continued on the next page)

1. continued.

(c) Solve

$$y = \frac{2y + 1}{5}$$

Show clear algebraic working.

(3 marks)

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

(Total for Question 1 is 7 marks)

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2. Look at the diagram for Question 2(a) and (b) in the Diagram Book.

It shows triangle **A** and triangle **B** on a coordinate grid.

A cut out shape is available if you wish to use it.

- (a) Describe fully the single transformation that maps triangle **A** onto triangle **B**  
(3 marks)

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- (b) On the grid, translate triangle **A** by the vector  
$$\begin{pmatrix} 2 \\ -5 \end{pmatrix}$$

Label the new triangle **C**  
(1 mark)

(continued on the next page)



**2. continued.**

**(c) Look at the diagram for Question 2(c) in the Diagram Book.**

**It shows triangle D and triangle E on a coordinate grid.**

**Describe fully the single transformation that maps triangle D onto triangle E**

**Two cut out shapes are available if you wish to use them.**

**(2 marks)**

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**(Total for Question 2 is 6 marks)**

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- 3. Look at the diagram and at the table for Question 3 in the Diagram Book.**

**The diagram shows a biased 5-sided spinner.**

**When the spinner is spun, it can land on red, blue, green, brown or yellow.**

**The table in the Diagram Book gives the probabilities that the spinner lands on red or on blue or on green.**

**When the spinner is spun once, the probability that the spinner lands on brown is  $0.06$  more than the probability that the spinner lands on yellow.**

**Jenine spins the spinner 150 times.**

**Work out an estimate for the number of times the spinner lands on yellow.**

**(4 marks)**

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

**3. continued.**

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**(Total for Question 3 is 4 marks)**

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4. Look at the table for Question 4 in the Diagram Book.

It gives information about the price of gold.

- (a) Work out the percentage increase in the price of gold between 1st February 2016 and 1st March 2016

Give your answer correct to 3 significant figures.

(3 marks)

\_\_\_\_\_ %

(continued on the next page)

Turn over

**4. continued.**

**The price of one ounce of gold on  
1st February 2016 was 1126·50 dollars.**

**The price of gold increased by 19% from  
1st February 2016 to 1st July 2016**

**(b) Work out the price of one ounce of gold on  
1st July 2016**

**Give your answer correct to the nearest dollar.**

**(3 marks)**

\_\_\_\_\_ dollars

**(Total for Question 4 is 6 marks)**

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**Turn over**

5. Look at the diagram for Question 5 in the Diagram Book.

It is NOT accurately drawn.

**BCD** and **AFE** are straight lines.

$$\text{Angle BCF} = (4y + 15)^\circ$$

$$\text{Angle DCF} = (30y - 5)^\circ$$

$$\text{Angle CFA} = (20y + 45)^\circ$$

Show that **BCD** is parallel to **AFE**

Give reasons for your working.

(5 marks)

Answer space continues on the next page.

5. continued.

(Total for Question 5 is 5 marks)

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Turn over

6. (a) Complete the table of values below for  
 $y = x^2 - 5x + 6$

There are two spaces to fill.

(1 mark)

x	y
0	6
1	
2	0
3	0
4	2
5	

(continued on the next page)



6. continued.

(b) Look at the diagram for Question 6 in the Diagram Book.

On the grid, draw the graph of

$$y = x^2 - 5x + 6 \text{ for } 0 \leq x \leq 5$$

(2 marks)

(c) By drawing a suitable straight line on the grid, find estimates for the solutions of the equation

$$x^2 - 5x = x - 7$$

(3 marks)

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(Total for Question 6 is 6 marks)

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Turn over

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

It shows the volumes, in  $\text{km}^3$ , of four oceans.

- (a) Write  $7.18 \times 10^7$  as an ordinary number.  
(1 mark)

\_\_\_\_\_

- (b) Calculate the total volume of these four oceans.  
(2 marks)

\_\_\_\_\_  $\text{km}^3$

(continued on the next page)

**7. continued.**

**The volume of the South China Sea is  
9 880 000 km<sup>3</sup>**

**(c) Write 9 880 000 in standard form.  
(1 mark)**

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**(Total for Question 7 is 4 marks)**

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8. Look at the diagram for Question 8 in the Diagram Book.

It is NOT accurately drawn.

It shows an isosceles triangle, **ABC**

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

$$BC = 5 \text{ cm}$$

The area of the triangle is  $12 \text{ cm}^2$

Work out the perimeter of the triangle.

Give your answer correct to 3 significant figures.

(4 marks)

Answer space continues on the next page.

8. continued.

\_\_\_\_\_ cm

(Total for Question 8 is 4 marks)

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Turn over

9. Look at the table for Question 9 in the Diagram Book.

It shows information about the speeds of 60 cycles.

- (a) Complete the cumulative frequency table below.  
(1 mark)

Speed ( $s$ km/h)	Cumulative frequency
$0 < s \leq 10$	
$0 < s \leq 20$	
$0 < s \leq 30$	
$0 < s \leq 40$	
$0 < s \leq 50$	
$0 < s \leq 60$	

(continued on the next page)

**9. continued.**

**(b) Look at the diagram for Question 9(b) and (c) in the Diagram Book.**

**On the grid, draw a cumulative frequency graph for your table.**

**(2 marks)**

**(c) Use your graph to find an estimate for the interquartile range of the speeds.**

**(2 marks)**

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

**(Total for Question 9 is 5 marks)**

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**Turn over**

10. Look at the diagram for Question 10 in the Diagram Book.

It is NOT accurately drawn.

It shows triangle ABD

The point C lies on BD

$AD = 13 \text{ cm}$

$BC = 8 \text{ cm}$

angle  $ADB = 90^\circ$

angle  $CAD = 20^\circ$

Calculate the size of angle BAC

Give your answer correct to 1 decimal place.

(5 marks)

Answer space continues on the next page.



10. continued.

o

\_\_\_\_\_  
(Total for Question 10 is 5 marks)

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Turn over

11. Express

$$\frac{5}{3} - \frac{y+2}{2y}$$

as a single fraction in its simplest terms.

(3 marks)

Answer space continues on the next page.

11. continued.

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(Total for Question 11 is 3 marks)

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12. The curve **C** has equation

$$y = \frac{1}{3}x^3 - 9x + 1$$

(a) Find  $\frac{dy}{dx}$

(2 marks)

$$\frac{dy}{dx} = \underline{\hspace{4cm}}$$

(continued on the next page)

**12. continued.**

**(b) Find the range of values of  $x$  for which  $C$  has a negative gradient.**

**(3 marks)**

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**(Total for Question 12 is 5 marks)**

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**Turn over**

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

**It shows an incomplete Venn diagram.**

**All the students in Year 11 at a school must study at least one of Geography (set **G**), History (set **H**) and Religious Studies (set **R**)**

**In Year 11 there are 65 students.**

**Of these students**

**15 study Geography, History and Religious Studies**

**21 study Geography and History**

**16 study Geography and Religious Studies**

**30 study Geography**

**18 study only Religious Studies**

**37 study Religious Studies**

**(a) Using this information, complete the Venn diagram to show the number of students in each region of the Venn diagram.**

**(3 marks)**

**(continued on the next page)**

**Turn over**

**13. continued.**

**A student in Year 11 who studies both History and Religious Studies is chosen at random.**

**(b) Work out the probability that this student does NOT study Geography.**

**(2 marks)**

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**(Total for Question 13 is 5 marks)**

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14. **T** is directly proportional to the cube of **r**

$$T = 21.76 \text{ when } r = 4$$

- (a) Find a formula for **T** in terms of **r**  
(3 marks)

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(continued on the next page)

Turn over



14. continued.

- (b) Work out the value of  $T$  when  $r = 6$   
(1 mark)

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(Total for Question 14 is 4 marks)

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15. The total surface area of a solid hemisphere is equal to the curved surface area of a cylinder.

The radius of the hemisphere is  $r$  cm

The radius of the cylinder is twice the radius of the hemisphere.

Given that

volume of hemisphere : volume of cylinder =  $1 : m$

find the value of  $m$

(4 marks)

Answer space continues on the next page.

15. continued.

$m =$  \_\_\_\_\_

(Total for Question 15 is 4 marks)

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Turn over

16. (a) Rationalise the denominator of

$$\frac{p + \sqrt{4q}}{p - \sqrt{4q}} \text{ where } p \text{ is an integer and } q \text{ is a}$$

prime number.

Simplify your answer.

(3 marks)

Answer space continues on the next page.

16. (a) continued.

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(continued on the next page)

16. continued.

(b) Given that

$$\left(\sqrt{\frac{y}{x}}\right)^{-5} = \frac{x^m}{y^m}$$

where  $x \neq y$

find the value of  $m$

(1 mark)

$m =$  \_\_\_\_\_

(Total for Question 16 is 4 marks)

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

It is NOT accurately drawn.

It shows a triangle **ABC**

$$BC = 5.3 \text{ cm}$$

$$BA = 4.1 \text{ cm}$$

$$\text{Angle } ABC = 110^\circ$$

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

Calculate the value of the angle marked **x**

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

(5 marks)

Answer space continues on the next page.

17. continued.

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(Total for Question 17 is 5 marks)

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

The graph of  $y = f(x)$  is shown on the grid.

(a) On the grid, sketch the graph of

$$y = f\left(\frac{1}{2}x\right)$$

(2 marks)

Look at the diagram for Question 18(b) in the Diagram Book.

The graphs of  $y = f(x)$  and  $y = f(x + k)$  are shown on the grid.

(b) Write down the value of  $k$

(1 mark)

\_\_\_\_\_

(Total for Question 18 is 3 marks)

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19.  $g$  is the function with domain  $x \geq -3$  such that  
 $g(x) = x^2 + 6x$

- (a) Write down the range of  $g^{-1}$   
(1 mark)

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

Answer space continues on the next two pages.

19. (b) continued.

19. (b) continued.

$$g^{-1}: x \mapsto \underline{\hspace{10cm}}$$

(Total for Question 19 is 5 marks)

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20. A bowl contains  $n$  pieces of fruit.

Of these, 4 are oranges and the rest are apples.

Two pieces of fruit are going to be taken at random from the bowl.

The probability that the bowl will then contain

$(n - 6)$  apples is  $\frac{1}{3}$

Work out the value of  $n$

Show your working clearly.

(6 marks)

Answer space continues on the next two pages.

20. continued.

20. continued.

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(Total for Question 20 is 6 marks)

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21.  $(2y + 23)$ ,  $(8y + 2)$  and  $(20y - 52)$  are three consecutive terms of an arithmetic sequence.

Prove that the common difference of the sequence is 12

(4 marks)

Answer space continues on the next page.



21. continued.

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(Total for Question 21 is 4 marks)

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**TOTAL FOR PAPER IS 100 MARKS**

**END OF PAPER**

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