

**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>					

**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)



(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)

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

(Total for Question 1 is 7 marks)

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Turn over

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 cm**

**BC = 8 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.

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(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)

$$\frac{dy}{dx} = \underline{\hspace{10em}}$$

(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

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

prime number.

Simplify your answer.

(3 marks)

Answer space continues on the next page.

16. (a) continued.



(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)

  

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(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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