

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

Total Marks

# **Mathematics A**

## **Paper 2H** **(Calculator)** **Higher Tier**

**Thursday 4 June 2020 – 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>					

**Y62657A**

**YOU MUST HAVE**

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

**YOU WILL BE GIVEN**

**Diagram Book  
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.**

**You may be provided with models for Question 9 and Question 18**

## **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 ONE  
questions.**

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

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

**Turn over**

1. (a) Simplify

$$m^6 \times m^4$$

(1 mark)

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(b) Simplify

$$k^{10} \div k^3$$

(1 mark)

---

(continued on the next page)

Turn over

1. continued.

(c) Simplify

$$(3pq^4)^2$$

(2 marks)

---

(continued on the next page)

Turn over

1. continued.

(d) Solve the inequality

$$4t + 7 > 2$$

(2 marks)

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**(Total for Question 1 is 6 marks)**

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**Turn over**

**2. Look at the table for Question 2 in the Diagram Book.**

**It shows information about the lengths of time, in minutes, 120 customers spent in a supermarket.**

**(a) Write down the modal class.  
(1 mark)**

---

**(continued on the next page)**

**Turn over**

**2. continued.**

**(b) Work out an estimate for the mean length of time spent by the 120 customers in the supermarket.**

**(4 marks)**

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

2. (b) continued.

\_\_\_\_\_ minutes

**(Total for Question 2 is 5 marks)**

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**Turn over**

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

It is NOT accurately drawn.

It shows a parallelogram **ABCD** and an isosceles triangle **DEF** in which **DE = DF**

**CDF** and **ADE** are straight lines.

Angle **BCD** =  $58^\circ$

Work out the size of angle **DEF**

Give a reason for each stage of your working.

(5 marks)

Answer space is on the next two pages.

Turn over

**3. continued.**

**Turn over**

**3. continued.**

\_\_\_\_\_ ○

**(Total for Question 3 is 5 marks)**

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**Turn over**

4. **Andreas, Isla and Paulo share some money in the ratios 3 : 2 : 5**

**The TOTAL amount of money that Isla and Paulo receive is £76 more than the amount of money that Andreas receives.**

**Andreas buys a video game for £48.50 with some of his share of the money.**

**(continued on the next page)**

**4. continued.**

**Work out how much money Andreas has left from his share of the money when he has bought the video game.**

**(4 marks)**

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

4. continued.

**Turn over**

4. continued.

£ \_\_\_\_\_

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

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**Turn over**

5. Himari's annual salary is  
**3 130 000 Japanese Yen (JPY)**  
She gets a salary increase of **4%**

(a) Work out Himari's salary after  
this increase.

(3 marks)

Answer space continues on the  
next page.

5. (a) continued.

\_\_\_\_\_ JPY

(continued on the next page)

Turn over

**5. continued.**

**Kaito bought a car.**

**The value of the car when Kaito bought it was 750 000 JPY**

**At the end of each year, the value of his car had depreciated by 15%**

**(b) Work out the value of Kaito's car at the end of 3 years.**

**Give your answer correct to the nearest JPY**

**(3 marks)**

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

**5. (b) continued.**

**Turn over**

5. (b) continued.

\_\_\_\_\_ JPY

**(Total for Question 5 is 6 marks)**

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**Turn over**

**6. Look at the diagram for Question 6 in the Diagram Book.**

**It shows line **L** on a grid.**

**Find an equation for **L**  
(2 marks)**

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

6. continued.

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**(Total for Question 6 is 2 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 a right-angled triangle **ABC**

$$AC = 3.4 \text{ cm}$$

$$CB = 4.7 \text{ cm}$$

Angle **ACB** is a right angle.

Angle **ABC** is marked  $x^\circ$

Calculate the value of **x**

Give your answer correct to one decimal place.

(3 marks)

Answer space is on the next three pages.

Turn over

7. continued.

Turn over

7. continued.

Turn over

**7. continued.**

**X = \_\_\_\_\_**

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

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**Turn over**

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

It is NOT accurately drawn.

It shows an isosceles triangle **PQR**

$$PQ = PR = 8.5 \text{ cm}$$

$$RQ = 8 \text{ cm}$$

Work out the area of the triangle.

(4 marks)

Answer space continues on the next two pages.

**8. continued.**

**Turn over**

8. continued.

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

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

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**Turn over**

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

You may be provided with a model.

They are NOT accurate.

They show a solid cylinder with radius 3 metres.

The volume of the cylinder is  $72\pi\text{m}^3$

Calculate the TOTAL surface area of the cylinder.

Give your answer correct to

3 significant figures.

(5 marks)

Answer space is on the next page.

9. continued.

\_\_\_\_\_ m<sup>2</sup>

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

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**Turn over**

**10. Look at the table for Question 10 in the Diagram Book.**

**It shows information about the number of minutes each of 120 buses was late last Monday.**

**(a) Complete the cumulative frequency table on the next page.  
(1 mark)**

10. (a) continued.

<b>Number of minutes late (L)</b>	<b>Cumulative frequency</b>
$0 < L \leq 10$	
$0 < L \leq 20$	
$0 < L \leq 30$	
$0 < L \leq 40$	
$0 < L \leq 50$	
$0 < L \leq 60$	

(continued on the next page)

Turn over

**10. continued.**

**(b) Look at the diagram for  
Question 10(b) in the  
Diagram Book.**

**It is a grid.**

**Draw a cumulative frequency  
graph for your table on the grid.**

**(2 marks)**

**(continued on the next page)**

**Turn over**

10. continued.

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

(2 marks)

\_\_\_\_\_ minutes

(continued on the next page)

Turn over

10. continued.

(d) Use your graph to find an estimate for the number of buses that were more than **50** minutes late last Monday.

(2 marks)

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**(Total for Question 10 is 7 marks)**

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Turn over

11. (a) Simplify fully

$$(8p^{15})^{\frac{2}{3}}$$

(2 marks)



(continued on the next page)

Turn over

11. continued.

(b) Express

$$\left(\frac{y}{2}\right)^{-4} \text{ in the form } ay^n$$

where **a** and **n** are integers.

(2 marks)

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(continued on the next page)

Turn over

11. continued.

(c) Solve

$$\frac{4x - 2}{3} - \frac{5 - 3x}{4} = 6$$

Show clear algebraic working.

(4 marks)

Answer space continues on the  
next page.

Turn over

11. (c) continued.

**X = \_\_\_\_\_**

**(Total for Question 11 is 8 marks)**

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**Turn over**

12. Given that

$$\frac{3^x}{9^{3x}} = 81$$

find the value of  $x$

Show clear algebraic working.

(3 marks)

Answer space continues on the next page.

Turn over

12. continued.

**X =** \_\_\_\_\_

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

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**Turn over**

13. Use algebra to show that

$$0.6\bar{8}1 = \frac{15}{22}$$

(2 marks)

Answer space continues on the next page.

**13. continued.**

**(Total for Question 13 is 2 marks)**

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**Turn over**

14.  $\mathcal{U} = \{\text{integers } x \text{ such that}$   
 $10 \leq x \leq 25\}$

$$A = \{x : x < 18\}$$

$$B = \{x : 13 \leq x < 22\}$$

(a) Write down  $n(A)$

(1 mark)

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(continued on the next page)

Turn over

14. continued.

Remember:

$$\mathcal{U} = \{\text{integers } x \text{ such that} \\ 10 \leq x \leq 25\}$$

$$A = \{x : x < 18\}$$

$$B = \{x : 13 \leq x < 22\}$$

(b) List the members of the  
set  $(A \cup B)'$

(2 marks)

Answer space continues on the  
next page.

Turn over

14. (b) continued.



(continued on the next page)

Turn over

14. continued.

Remember:

$$\mathcal{U} = \{\text{integers } x \text{ such that} \\ 10 \leq x \leq 25\}$$

$$A = \{x : x < 18\}$$

$$B = \{x : 13 \leq x < 22\}$$

(c) List the members of the  
set  $A' \cap B$

(2 marks)

Answer space continues on the  
next page.

Turn over

14. (c) continued.



**(continued on the next page)**

**Turn over**

14. continued.

Remember:

$$\mathcal{E} = \{\text{integers } x \text{ such that} \\ 10 \leq x \leq 25\}$$

$$A = \{x : x < 18\}$$

$$B = \{x : 13 \leq x < 22\}$$

Given that

$$C \subset A, C \subset B \text{ and } n(C) = 5$$

(d) List the members of the set **C**  
(1 mark)

Answer space continues on the  
next page.

Turn over

**14. (d) continued. 54**

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

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**Turn over**

15. Make  $y$  the subject of

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

(4 marks)

Answer space continues on the next page.

Turn over

15. continued.

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

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**Turn over**

16. Solve the simultaneous equations

$$3xy - y^2 = 8$$

$$x - 2y = 1$$

Show clear algebraic working.

(5 marks)

Answer space continues on the next three pages.

Turn over

16. continued.

Turn over

16. continued.

Turn over

16. continued.

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**(Total for Question 16 is 5 marks)**

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**Turn over**

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

It is NOT accurately drawn.

It shows a rectangle PQRS

$$PQ = (2y - 4) \text{ cm}$$

$$PS = (3y + 2) \text{ cm}$$

The area of the rectangle is  $A \text{ cm}^2$

Given that  $A < 3y + 27$

find the range of possible values

for  $y$

(5 marks)

Answer space is on the next

two pages.

17. continued.

Turn over

17. continued.

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

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**Turn over**

18. Look at the diagram for Question 18 in the Diagram Book.

You may be provided with a model.

They are NOT accurate.

They show cuboid **ABCDEFGH**

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

$$AH = 4 \text{ cm}$$

The size of the angle between **CH** and the plane **ABCD** is  $35^\circ$

Calculate the volume of the cuboid.

Give your answer correct to

**3** significant figures.

(5 marks)

Answer space is on the next

two pages.

Turn over

**18. continued.**

**Turn over**

18. continued.

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

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

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**Turn over**

19. **OAB** is a triangle.

$$\overrightarrow{OA} = \underline{\mathbf{a}} \quad \overrightarrow{OB} = \underline{\mathbf{b}}$$

The point **C** lies on **OA** such that

$$\mathbf{OC} : \mathbf{CA} = 1 : 2$$

The point **D** lies on **OB** such that

$$\mathbf{OD} : \mathbf{DB} = 1 : 2$$

Using a vector method, prove that

**ABDC** is a trapezium.

(3 marks)

Answer space continues on the next two pages.

Turn over

19. continued.

Turn over

19. continued.

**(Total for Question 19 is 3 marks)**

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**Turn over**

20. A bag contains  $X$  counters.

There are only red counters and blue counters in the bag.

There are 4 more blue counters than red counters in the bag.

Finty takes at random 2 counters from the bag.

The probability that Finty takes 2 blue counters from the bag is  $\frac{3}{8}$

Work out the value of  $X$

Show clear algebraic working.

(5 marks)

Answer space is on the next three pages.

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. The function  $f$  is such that

$$f(x) = 5 + 6x - x^2 \quad \text{for } x \leq 3$$

- (a) Express  $5 + 6x - x^2$   
in the form  $p - (x - q)^2$   
where  $p$  and  $q$  are constants.  
(2 marks)

Answer space continues on the  
next page.

**21. (a) continued.**



**(continued on the next page)**

**Turn over**

**21. continued.**

**(b) Using your answer to part (a),  
find the range of values of  $x$   
for which  $f^{-1}(x)$  is positive.**

**(5 marks)**

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

**Turn over**

21. (b) continued.

21. (b) continued.



**(Total for Question 21 is 7 marks)**



**TOTAL FOR PAPER IS 100 MARKS**

**END OF PAPER**

