

**Paper Reference 4MA1/2H**

**Pearson Edexcel**

**International GCSE**

Total Marks

**Mathematics A**

**PAPER 2H**

**Higher Tier**

**(Calculator)**

**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>					

**Y65918A**

**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 a model for Question 10  
It is NOT accurate.**

**ADVICE**

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

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

**Good luck with your examination.**

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**6**

**Answer ALL TWENTY THREE  
questions.**

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

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

**Turn over**

**7**

- 1. Write 600 as a product of powers of its prime factors.**

**Show your working clearly.**

**(3 marks)**

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

**Turn over**

1. continued.

**Turn over**

**1. continued.**

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

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**Turn over**

2. Show that

$$2\frac{4}{7} \div 1\frac{1}{8} = 2\frac{2}{7}$$

(3 marks)

Answer space continues on the next page.

Turn over

**2. continued.**

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

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**Turn over**

3. The bearing of Paris from London is  $149^\circ$

Work out the bearing of London from Paris.

(2 marks)

Answer space continues on the next page.

**3. continued.**

\_\_\_\_\_ ○

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

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**Turn over**

4.  $\mathcal{E} = \{\text{letters of the alphabet}\}$

$B = \{\text{b, r, a, z, i, l}\}$

$I = \{\text{i, r, e, l, a, n, d}\}$

(a) List the members of the set

(i)  $B \cup I$

---

(continued on the next page)

Turn over

4. (a) continued.

Remember:

$\mathcal{E} = \{\text{letters of the alphabet}\}$

$B = \{\text{b, r, a, z, i, l}\}$

$I = \{\text{i, r, e, l, a, n, d}\}$

(ii)  $B \cap I'$

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(2 marks)

(continued on the next page)

Turn over

4. continued.

Remember:

$\mathcal{E} = \{\text{letters of the alphabet}\}$

$B = \{\text{b, r, a, z, i, l}\}$

$I = \{\text{i, r, e, l, a, n, d}\}$

$K = \{\text{k, e, n, y, a}\}$

Cody writes down the statement

$$B \cap K = \emptyset$$

Cody's statement is wrong.

(b) Explain why.

(1 mark)

Answer space and lines continue  
on the next page.

Turn over

4. (b) continued.

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

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**Turn over**

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

It is NOT accurately drawn.

**ABCD** and **FGHI** are parallel straight lines.

**EBGJ** and **ECH** are straight lines.

**BE = CE**

Angle **BEC** =  $44^\circ$

Work out the size of angle **JGH**

Give a reason for each stage of your working.

(5 marks)

Answer space is on the next two pages.

Turn over

**5. continued.**

**Turn over**

20

5. continued.

\_\_\_\_\_ ○

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

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**Turn over**

6. Mariana sells bags of bird food.

The bags that Mariana sold last week each contained **12 kg** of seeds.

The bags that she is going to sell next week will each contain a mixture of nuts and seeds where for each bag

weight of nuts : weight of seeds =  
**4 : 5**

The total weight of the nuts and the seeds in each bag will be **19.35 kg**

(continued on the next page)

Turn over

**6. continued.**

**The weight of seeds in each bag that Mariana sells next week will be less than the weight of seeds in each bag that Mariana sold last week.**

**Work out this decrease as a percentage of the weight of seeds in each bag that Mariana sold last week.**

**Give your answer correct to one decimal place.**

**(4 marks)**

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

**Turn over**

**6. continued.**

**Turn over**

6. continued.

\_\_\_\_\_ %

**(Total for Question 6 is 4 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**

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

$$AC = 6.5 \text{ cm}$$

$$\text{Angle } ABC = 42^\circ$$

Angle **ACB** is a right-angle.

Work out the value of **x**

Give your answer correct to one decimal place.

(3 marks)

Answer space is on the next two pages.

Turn over

7. continued.

Turn over

7. continued.

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

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

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**Turn over**

8. Solve the simultaneous equations

$$5r + 2t = 10$$

$$2r - 4t = 7$$

Show clear algebraic working.

(3 marks)

Answer space continues on the next page.

8. continued.

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

**t =** \_\_\_\_\_

**(Total for Question 8 is 3 marks)**

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**Turn over**

**30**

**9. (i) Factorise**

$$y^2 + 2y - 24$$

**(2 marks)**



**(continued on the next page)**

**Turn over**

9. continued.

(ii) Hence solve

$$y^2 + 2y - 24 = 0$$

(1 mark)

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**(Total for Question 9 is 3 marks)**

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**Turn over**

10. Look at Diagram 1 and Diagram 2 for Question 10 in the Diagram Book.  
You may be provided with a model.  
They are NOT accurate.

Diagram 1 and the model show a triangular prism, **ABCDEF**

Diagram 2 shows the cross section of the prism, **AED**

$$BC = AD = 11.2 \text{ cm}$$

$$DC = EF = AB = 15 \text{ cm}$$

$$ED = FC = 7.4 \text{ cm}$$

Angles **AED** and **BFC** are right angles.

(continued on the next page)

Turn over

**10. continued.**

**Work out the volume of the prism.**

**Give your answer correct to**

**3 significant figures.**

**(5 marks)**

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

**Turn over**

10. continued.

Turn over

10. continued.

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

**(Total for Question 10 is 5 marks)**

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**Turn over**

- 11. Chengbo sold a house for  
180 000 yuan.**

**The amount for which he sold the  
house is 24% more than the amount  
he paid for the house.**

- (a) Work out how much Chengbo  
paid for the house.**

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

**(3 marks)**

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

11. (a) continued.

\_\_\_\_\_ yuan

(continued on the next page)

Turn over

**11. continued.**

**Zhi bought a house on  
1st January 2017**

**When she bought the house, its value  
was 120 000 yuan.**

**The value of the house increased by  
1.8% per year.**

**(b) Work out the value of Zhi's house  
on 1st January 2020**

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

**(3 marks)**

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

**Turn over**

**11. (b) continued.**

**Turn over**

**40**

**11. (b) continued.**

\_\_\_\_\_ **yuan**

**(Total for Question 11 is 6 marks)**

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**Turn over**

**12. Look at the diagram for Question 12(a) in the Diagram Book.**

**It shows a grid.**

**The cumulative frequency table on the next page gives information about the distance, in kilometres, that each of 80 workers travel from home to work at Office A**

12. continued.

<b>Distance travelled (d km)</b>	<b>Cumulative frequency</b>
<b><math>0 &lt; d \leq 5</math></b>	<b>10</b>
<b><math>0 &lt; d \leq 10</math></b>	<b>30</b>
<b><math>0 &lt; d \leq 15</math></b>	<b>50</b>
<b><math>0 &lt; d \leq 20</math></b>	<b>70</b>
<b><math>0 &lt; d \leq 25</math></b>	<b>77</b>
<b><math>0 &lt; d \leq 30</math></b>	<b>80</b>

(continued on the next page)

Turn over

**12. continued.**

**(a) On the grid in the Diagram Book, draw a cumulative frequency graph for the information in the table.**

**(2 marks)**

**(b) Use your graph to find an estimate for the median distance travelled.**

**(1 mark)**

\_\_\_\_\_ km

**(continued on the next page)**

**Turn over**

12. continued.

- (c) Use your graph to find an estimate for the interquartile range of the distances travelled.  
(2 marks)

\_\_\_\_\_ km

(continued on the next page)

Turn over

12. continued.

For Office **B**, the median distance workers travel from home to work is **15 km** and the interquartile range is **5 km**

(d) Use the information above to compare the distances that workers at Office **A** and workers at Office **B** travel from home to work.

Write down **TWO** comparisons.

(2 marks)

Answer lines are on the next page.

Turn over

12. (d) continued.

1

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2

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**(Total for Question 12 is 7 marks)**

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**Turn over**

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

**It shows an incomplete probability tree.**

**Emilie takes part in two races.**

**The probability that she wins the first race is  $0.7$**

**The probability that she wins the second race is  $0.4$**

**The outcomes of the two races are independent.**

**(continued on the next page)**

**13. continued.**

**(a) Complete the probability tree diagram in the Diagram Book.**

**There are four spaces to fill.**

**(2 marks)**

**(b) Work out the probability that Emilie wins exactly one of the two races.**

**(3 marks)**

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

**13. (b) continued.**



**(continued on the next page)**

**Turn over**

**13. continued.**

**Emilie is going to take part in a third race.**

**If she wins both of the first two races, the probability that she will win the third race is  $0.6$**

**If she wins exactly one of the first two races, the probability that she will win the third race is  $0.3$**

**(continued on the next page)**

**13. continued.**

**(c) Work out the probability that Emilie will win exactly two of the three races.**

**(3 marks)**

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

**Turn over**

13. (c) continued.



**(Total for Question 13 is 8 marks)**

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**Turn over**

14. Simplify fully

$$\left( \frac{9x^4}{16y^{10}} \right)^{-\frac{1}{2}}$$

(3 marks)

Answer space continues on the next page.

Turn over

14. continued.

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**(Total for Question 14 is 3 marks)**

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**Turn over**

15. (a) Complete the table of values for

$$y = \frac{1}{x}(x^2 + 4)$$

There are four spaces to fill.

(2 marks)

<b>x</b>	<b>y</b>
<b>0.25</b>	<b>16.25</b>
<b>0.5</b>	
<b>1</b>	
<b>2</b>	
<b>4</b>	
<b>8</b>	<b>8.5</b>

(continued on the next page)

Turn over

15. continued.

(b) Look at the diagram for Question 15(b) in the Diagram Book.

It shows a grid.

On the grid, draw the graph of

$$y = \frac{1}{x}(x^2 + 4) \text{ for } 0.25 \leq x \leq 8$$

(2 marks)

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

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Turn over

16. **A** is inversely proportional to the square of **r**

Given that

$$\mathbf{A = 5 \text{ when } r = 0.3}$$

(a) find a formula for **A** in terms of **r**  
(3 marks)

Answer space continues on the next page.

16. (a) continued.



**(continued on the next page)**

**Turn over**

16. continued.

Remember:

**A** is inversely proportional to the square of **r**

(b) Find the value of **A** when

$$r = 7.5A$$

(3 marks)

Answer space continues on the next page.

Turn over

16. (b) continued.

A = \_\_\_\_\_

**(Total for Question 16 is 6 marks)**

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**Turn over**

17. The straight line **L** passes through the points  $(4, -1)$  and  $(6, 4)$

The straight line **M** is perpendicular to **L** and intersects the **y**-axis at the point  $(0, 8)$

Find the coordinates of the point where **M** intersects the **x**-axis.

(4 marks)

Answer space continues on the next two pages.

17. continued.

Turn over

17. continued.

( \_\_\_\_\_ , \_\_\_\_\_ )

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

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**Turn over**

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

It is NOT accurately drawn.

**ABCD** is a quadrilateral where **A, B, C** and **D** are points on a circle.

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

$$BC = 7.5 \text{ cm}$$

$$\text{Angle } ABC = 98^\circ$$

$$\text{Angle } ACD = 35^\circ$$

(continued on the next page)

Turn over

18. continued.

Work out the perimeter of  
quadrilateral **ABCD**

Give your answer correct to  
one decimal place.

(6 marks)

Answer space continues on the next  
four pages.

18. continued.

Turn over

18. continued.

Turn over

18. continued.

Turn over

18. continued.

\_\_\_\_\_ cm

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

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**Turn over**

**19. Solve the simultaneous equations**

$$y = 3 - 2x$$
$$x^2 + y^2 = 18$$

**Show clear algebraic working.**

**(5 marks)**

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

**Turn over**

19. continued.

Turn over

19. continued.

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

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**Turn over**

**20. Mathematically similar wooden blocks are made in a workshop.**

**There are small blocks and there are large blocks.**

**The volume of each small block is  $300 \text{ cm}^3$**

**(continued on the next page)**

**20. continued.**

**Given that**

**the surface area of each small block :**

**the surface area of each large block =**

**25 : 36**

**work out the volume of each**

**large block.**

**(3 marks)**

**Answer space continues on the next**

**two pages.**

20. continued.

Turn over

20. continued.

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

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

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**Turn over**

21. The point **A** is the only stationary point on the curve with equation

$$y = kx^2 + \frac{16}{x} \text{ where } k \text{ is a constant.}$$

Given that the coordinates of **A** are  $\left(\frac{2}{3}, n\right)$

find the value of **n**

Show your working clearly.

(5 marks)

Answer space continues on the next three pages.

Turn over

21. continued.

Turn over

**21. continued.**

**Turn over**

21. continued.

$n =$  \_\_\_\_\_

**(Total for Question 21 is 5 marks)**

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**Turn over**

22. The curve **S** has equation  $y = f(x)$   
where  $f(x) = x^2$

The curve **T** has equation  $y = g(x)$   
where  $g(x) = 2x^2 - 12x + 13$

By writing  $g(x)$  in the form  
 $a(x - b)^2 - c$ , where  $a$ ,  $b$  and  $c$   
are constants, describe fully a series  
of transformations that map the  
curve **S** onto the curve **T**

(4 marks)

Answer space and lines continue on  
the next three pages.

**22. continued.**

**Turn over**

**22. continued.**

**Turn over**

**22. continued.**

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**(Total for Question 22 is 4 marks)**

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**Turn over**

**23. Pippa has a box containing  $N$  pens.**

**There are only black pens and red pens in the box.**

**The number of black pens in the box is 3 more than the number of red pens.**

**Pippa is going to take at random 2 pens from the box.**

**The probability that she will take a black pen FOLLOWED by a red pen is  $\frac{9}{35}$**

**(continued on the next page)**

**Turn over**

**23. continued.**

**Find the possible values of  $N$**

**Show clear algebraic working.**

**(5 marks)**

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

**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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**TOTAL FOR PAPER IS 100 MARKS**

**END OF PAPER**

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