

**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>					

**V65918A**

**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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**Answer ALL TWENTY THREE questions.**

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

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

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.**

**1. continued.**

**Turn over**

**1. continued.**

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

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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.**

**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)  $B \cup I$

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(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.

**4. (b) continued.**

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

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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**

**5. continued.**

\_\_\_\_\_ ○

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

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**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**

9. (i) Factorise

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

(2 marks)

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(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.**

**10. continued.**

**Turn over**

**10. continued.**

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

**(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>
$0 < d \leq 5$	10
$0 < d \leq 10$	30
$0 < d \leq 15$	50
$0 < d \leq 20$	70
$0 < d \leq 25$	77
$0 < d \leq 30$	80

(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** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**(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.**

13. (c) continued.

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**(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.

14. continued.



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



**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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**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.**

**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)**

**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.**

**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.**

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

**(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.

**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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