

Written by

With solutions by

Video Solutions



Class  
Maths



# PRACTICE PAPER FOR

## AQA Paper 1H (June 2023)

### ----- Disclaimer -----

In 2022 I wrote a series of predicted papers that in many cases reflected the real exam paper very well. This was due to the exam boards providing advance information on the topics that were going to be in each paper. This information is no longer provided so “predicting” a paper is not possible. Nobody can know what topics and types of questions will come up in each paper, apart from the few examiners that write them.

This paper has been created based on the **most common** paper 1 topics from previous years. Due to the nature of some topics they are better suited to paper 1 as if you had a calculator they would no longer be difficult to do. The paper should be excellent at helping students revise for exams, however should not be relied upon as the basis for revision. The topics from this paper may well appear in the real exams, however there is absolutely no guarantee of this for the reasons previously mentioned. Some topics may appear, some may not.

Ultimately the best way to prepare for the exams is to **revise all topics**.



@1stclassmaths

## ----- INFORMATION FOR TEACHERS -----

**You will want to remove this page before printing to ensure that questions across a double page print in the correct places.**

This paper been produced with careful analysis from previous papers.

The **Series** percentage below shows the percentage of times that this topic came up across a whole set of 3 papers. Some topics tend to appear almost every year in at least one paper.

The **Paper 1** percentage below shows the percentage of times that this topic came up specifically in the non calculator paper. As expected certain topics favour paper 1 over paper 2/3

I hope you find this data interesting/useful!

| Topic                            | Series | Paper 1 | Question(s) |
|----------------------------------|--------|---------|-------------|
| Write as a Ratio                 | 70%    | 30%     | 1           |
| Application of Ratio             | 90%    | 50%     | 1, 8        |
| Standard Form                    | 100%   | 70%     | 2           |
| Fraction Operations              | 60%    | 50%     | 3           |
| Linear Inequalities              | 80%    | 50%     | 4           |
| Column Vectors                   | 70%    | 30%     | 5           |
| Approximations                   | 40%    | 40%     | 6           |
| Volume of 3D shapes              | 100%   | 40%     | 6, 9        |
| Linear Simultaneous Equations    | 70%    | 50%     | 7           |
| Circles and Sectors              | 90%    | 70%     | 8           |
| Solve Quadratic Equation         | 90%    | 50%     | 10          |
| Cumulative Frequency             | 90%    | 70%     | 11          |
| Box Plots                        | 90%    | 30%     | 11          |
| Transformations                  | 90%    | 50%     | 12          |
| Gradients/Rate of Change         | 100%   | 50%     | 13          |
| Algebraic Fractions              | 90%    | 60%     | 14          |
| Change the Subject               | 80%    | 30%     | 14          |
| Direct and Inverse Proportion    | 90%    | 40%     | 15          |
| Probability of Successive Events | 80%    | 30%     | 16          |
| Sequences                        | 100%   | 80%     | 17          |
| Surds                            | 100%   | 90%     | 18, 21, 22  |
| Venn Diagrams                    | 100%   | 60%     | 19          |
| Transformations of Graphs        | 60%    | 40%     | 20          |
| Completing the Square            | 70%    | 30%     | 21          |
| Exact Trig Values                | 90%    | 90%     | 22          |
| Index Laws                       | 100%   | 100%    | 22          |



Answer **all** questions in the spaces provided.

Do not write  
outside the  
box

1 (a) Write the ratio 7 : 20 in the form  $n : 1$  [1 mark]

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Answer \_\_\_\_\_ : \_\_\_\_\_

1 (b) Divide 160 in the ratio 2 : 3 : 5 [3 marks]

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Answer \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_





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2 Put these numbers in order from smallest to largest. [2 marks]

$55 \times 10^5$

$6 \times 10^5$

$7 \times 10^{-7}$

$5 \times 10^6$

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Smallest \_\_\_\_\_

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Largest \_\_\_\_\_

3 Work out the mean of  $2\frac{1}{2}$ ,  $\frac{2}{3}$  and  $\frac{1}{6}$   
Give your answer as a mixed number. [4 marks]

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Answer \_\_\_\_\_

$\frac{\quad}{9}$

Turn over ►





4 (a)  $w = 10 - x$

$x$  is an integer where  $10 < 4x < 40$

Work out the greatest possible value for  $w$ .

[2 marks]

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Answer \_\_\_\_\_

4 (b) In fact  $x$  is **not** an integer.

What affect does this have on the greatest possible value for  $w$ ?

The greatest value for  $w$  increases

The greatest value for  $w$  decreases

The greatest value for  $w$  stays the same

Give a reason for your answer.

[2 marks]

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5 (a)  $\mathbf{a} = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$        $\mathbf{b} = \begin{pmatrix} -3 \\ 1 \end{pmatrix}$

Work out  $\mathbf{a} - 3\mathbf{b}$

[2 marks]

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Answer  $\begin{pmatrix} \quad \\ \quad \end{pmatrix}$

5 (b) Another vector,  $\mathbf{c}$ , is parallel to vector  $\mathbf{a}$  but twice the length.

Write down two vectors that could represent vector  $\mathbf{c}$ .

[2 marks]

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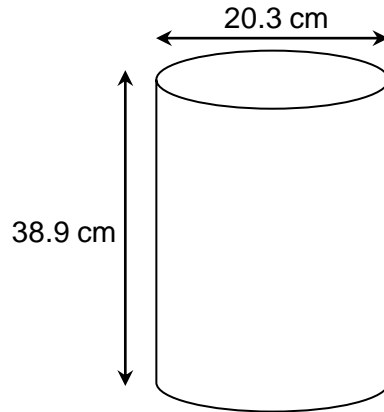
Answers  $\begin{pmatrix} \quad \\ \quad \end{pmatrix}$  and  $\begin{pmatrix} \quad \\ \quad \end{pmatrix}$

Turn over ►





6 Here is a cylindrical container.



The container is filled with water at a rate of 0.2 litres per second.

Show that the container will be completely filled in **approximately** 1 minute.

$1 \text{ cm}^3 = 1 \text{ ml}$

[4 marks]

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7 Solve the simultaneous equations [3 marks]

$$5x + 2y = 18$$

$$3x - 2y = 14$$

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Answer \_\_\_\_\_

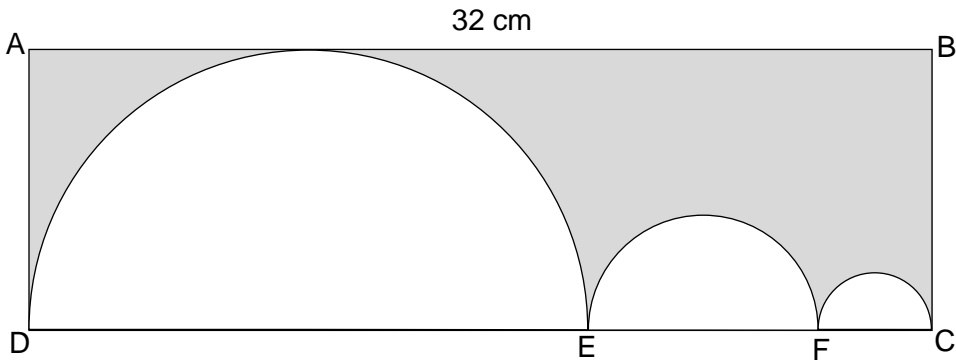
$\frac{7}{7}$

Turn over ►





8 ABCD is a rectangle



AB = 32 cm

DE, EF and FC are diameters of semicircles.

DE : EF : FC = 5 : 2 : 1

Work out the shaded area giving your answer in terms of  $\pi$

[4 marks]

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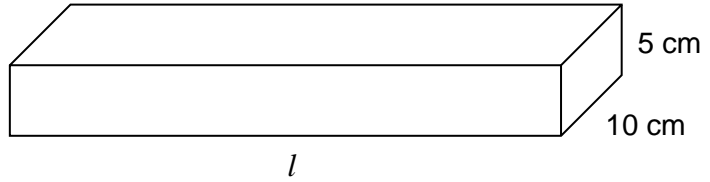
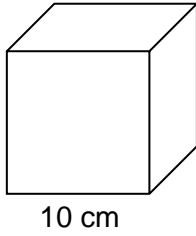
Answer \_\_\_\_\_ cm<sup>2</sup>





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9 Here is a cube and a cuboid.



The volume of the cube is equal to 40% of the volume of the cuboid.

Calculate the length,  $l$ , of the cuboid.

[4 marks]

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Answer \_\_\_\_\_ cm

10 Solve  $(3 - 5x)(x + 1) = 0$

[2 marks]

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Answer \_\_\_\_\_

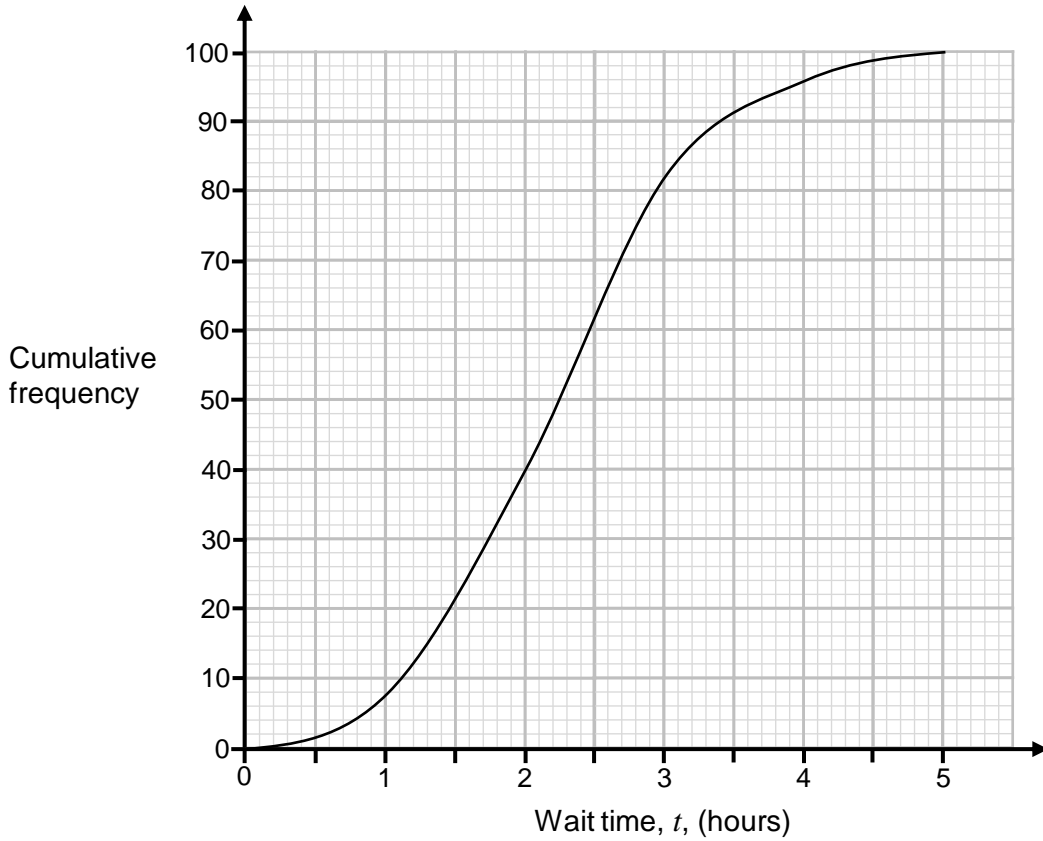
Turn over ►





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11 The cumulative frequency diagram shows information about the waiting times,  $t$ , in hours of 100 patients a hospital emergency department during March.



11 (a) Estimate the interquartile range of the waiting times in hours. [2 marks]

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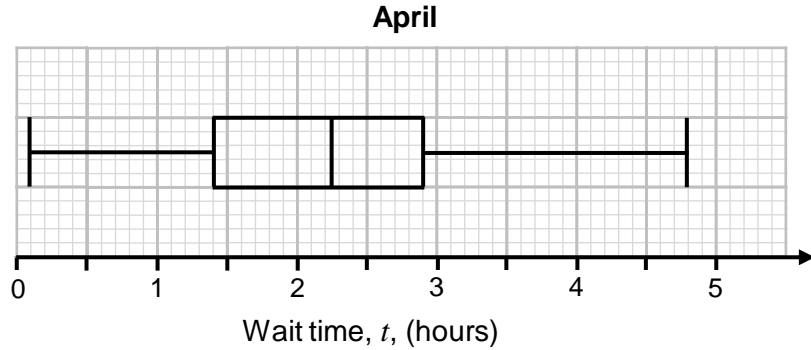
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Answer \_\_\_\_\_ hours



- 11 (b) During April, the hospital recruits more staff to try and reduce the average waiting time.

The box plot below shows the waiting times of 100 patients during April.



What affect did the extra staff recruited have on the average wait time?  
Tick a box.

The average wait time increased

The average wait time increased

The average wait time remained unchanged

You must give a reason for your answer.

[2 marks]

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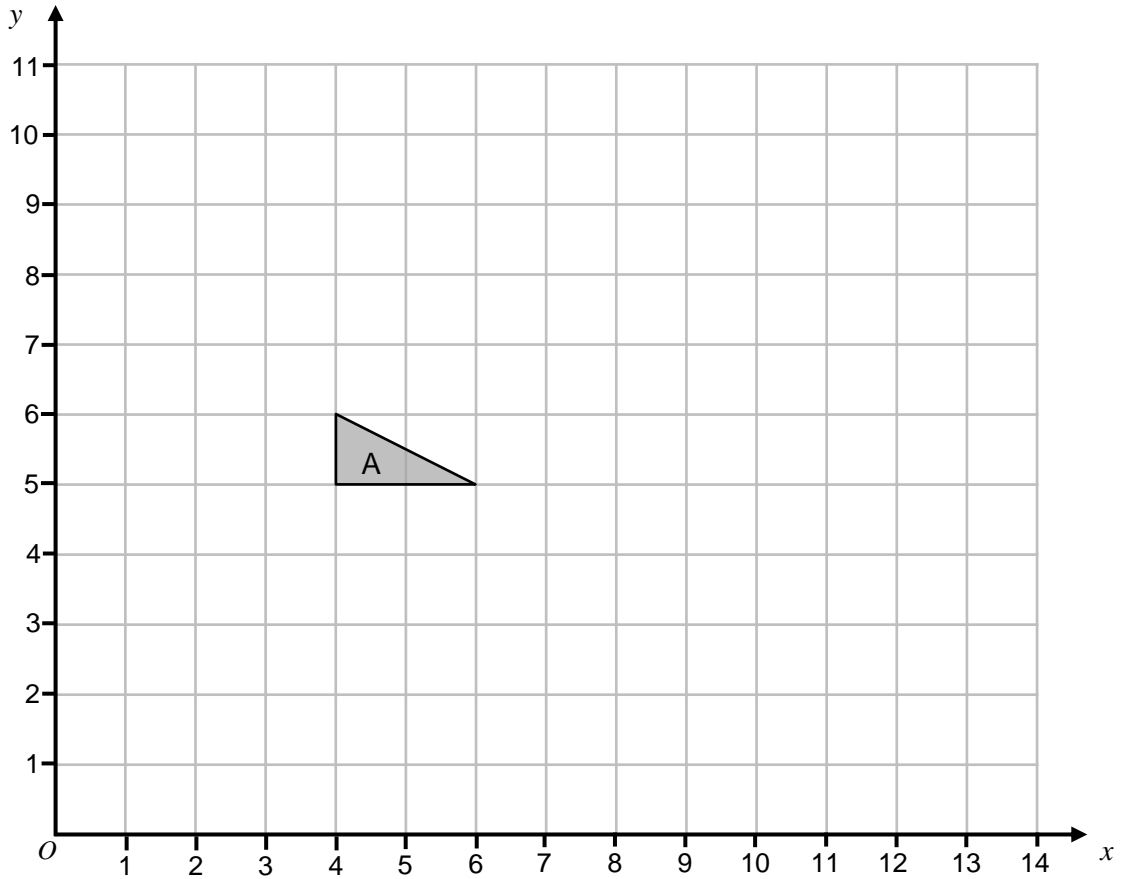




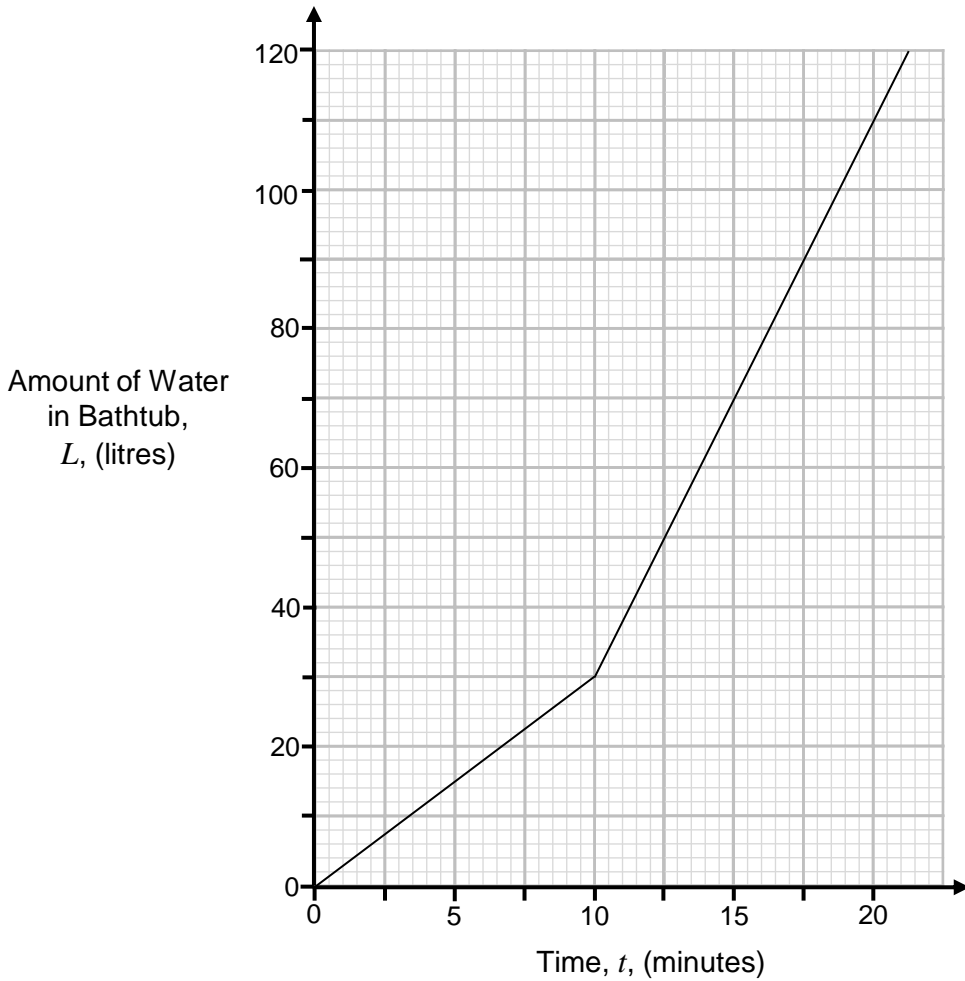
12

Enlarge shape A by scale factor  $-1\frac{1}{2}$  with centre of enlargement (8,6)

[2 marks]



13 The diagram below shows the amount of water in a bathtub as it fills.



The bathtub is initially empty.

During the first 10 minutes the cold tap is turned on fully but the hot tap is off.

Between 10 and 20 minutes both the cold and hot taps are turned on fully.

Work out the rate at which the **hot tap** only fills the bathtub.

[3 marks]

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Answer \_\_\_\_\_ litres per minute

$\frac{5}{1}$

Turn over ►





Do not write  
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14 (a) Simplify fully  $\frac{2x^2 - 4xy}{x^2 - 4y^2}$

[3 marks]

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Answer \_\_\_\_\_

14 (b) Rearrange  $y - b^{-1} = x$  to make  $b$  the subject

[3 marks]

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Answer \_\_\_\_\_





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15

Theresa needs to collect the wheat from her fields.  
She knows that the time it takes to collect the wheat is inversely proportional to the number of workers that she employs.

Last year Theresa employed 3 workers and it took them 20 days to collect all the wheat.

This year Theresa employs 4 workers.  
The 4 workers collect wheat for 6 days before one of them falls ill.

How many more days will it take the remaining 3 workers to collect all of the wheat?

[4 marks]

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Answer \_\_\_\_\_ days

10

Turn over ►

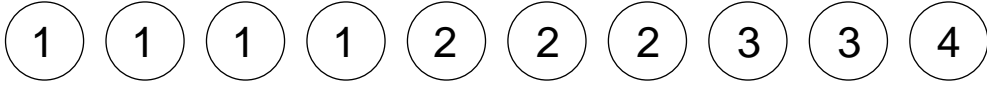






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16 A bag contains the following numbered counters.



A counter is taken from the bag at random and **not** replaced.  
A second counter is then taken from the bag at random.

Calculate the probability that the number of the first counter taken is a factor of the number of the second counter taken.

[4 marks]

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Answer \_\_\_\_\_





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17 The first 4 terms of a quadratic sequence are shown below

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Work out an expression for the  $n$ th term of the sequence

[4 marks]

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Answer \_\_\_\_\_

18 Write  $\frac{77}{\sqrt{7}} - \sqrt{175}$  in the form  $k\sqrt{7}$

[3 marks]

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Answer \_\_\_\_\_

Turn over ►



19 80 students were asked if they study History or Geography.

15% of the students study both History and Geography.

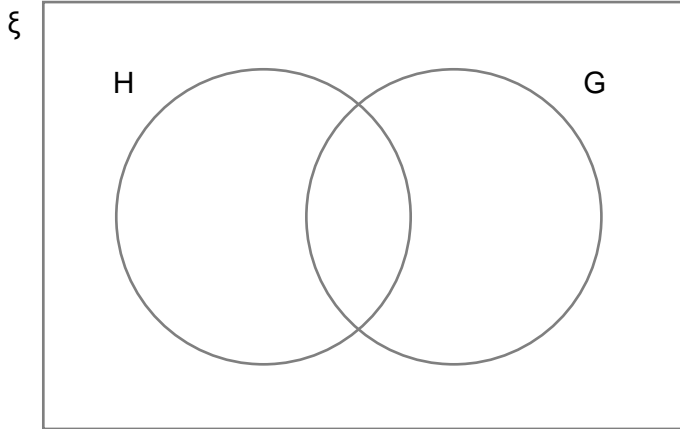
$\frac{1}{3}$  of the students who study History also study Geography.

$\frac{2}{5}$  of the students who study Geography also study History.

Work out the number of students who study neither subject.

You may use the Venn Diagram below to help with your answer.

[4 marks]



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Answer \_\_\_\_\_

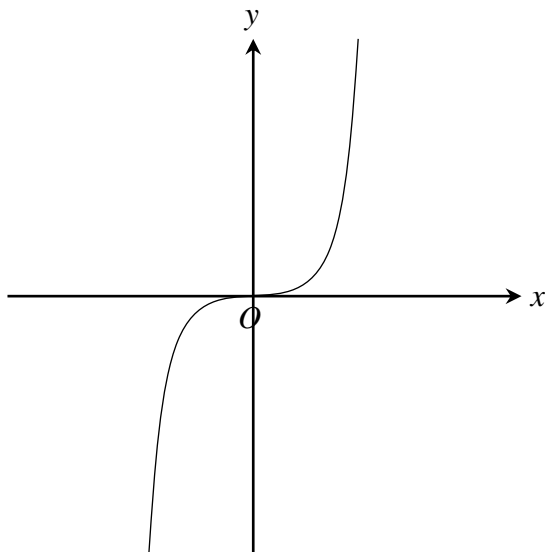




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20

Here is a sketch of the graph  $y = x^3$



The graph is translated by the vector  $\begin{pmatrix} 2 \\ 5 \end{pmatrix}$  to give a new graph.

The new graph has equation  $ax^3 + bx^2 + cx + d$

Work out the values of  $a$ ,  $b$ ,  $c$  and  $d$ .

[4 marks]

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$a =$  \_\_\_\_\_  $b =$  \_\_\_\_\_  $c =$  \_\_\_\_\_  $d =$  \_\_\_\_\_

$\frac{\quad}{8}$

Turn over ►





Do not write  
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21 The equation of a curve is  $y = x^2 - \sqrt{3}x + 1$

By completing the square, work out the coordinates of the turning point.

[3 marks]

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

22 Solve  $x^{0.25} = \frac{\cos(45^\circ)}{\cos(30^\circ)}$  [4 marks]

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$x =$  \_\_\_\_\_

$\frac{7}{7}$

