

Please check the examination details below before entering your candidate information

Candidate surname

Other names

**Pearson Edexcel  
International GCSE**

Centre Number

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Candidate Number

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**Tuesday 21 May 2019**

Morning (Time: 2 hours)

Paper Reference **4MA1/1H**

**Mathematics A  
Level 1/2  
Paper 1H  
Higher Tier**



**You must have:**

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.  
Anything you write on the formulae page will gain **NO** credit.

### Information

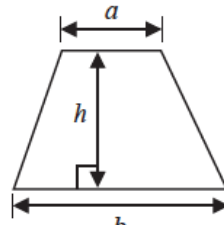
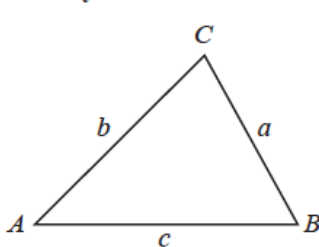
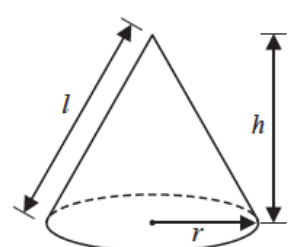
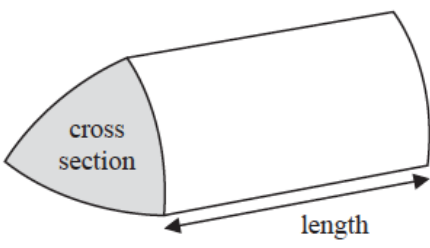
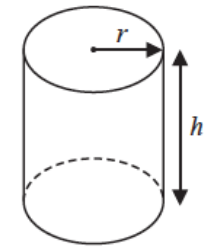
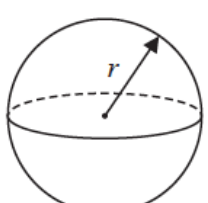
- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

**International GCSE Mathematics**

**Formulae sheet – Higher Tier**

<p><b>Arithmetic series</b> Sum to <math>n</math> terms, <math>S_n = \frac{n}{2} [2a + (n - 1)d]</math></p>	<p><b>Area of trapezium</b> <math>= \frac{1}{2}(a + b)h</math></p>
<p><b>The quadratic equation</b> The solutions of <math>ax^2 + bx + c = 0</math> where <math>a \neq 0</math> are given by:</p> $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	
<p><b>Trigonometry</b></p> 	<p><b>In any triangle <math>ABC</math></b></p> <p><b>Sine Rule</b> <math>\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}</math></p> <p><b>Cosine Rule</b> <math>a^2 = b^2 + c^2 - 2bc \cos A</math></p> <p><b>Area of triangle</b> <math>= \frac{1}{2}ab \sin C</math></p>
<p><b>Volume of cone</b> <math>= \frac{1}{3}\pi r^2 h</math></p> <p><b>Curved surface area of cone</b> <math>= \pi r l</math></p> 	<p><b>Volume of prism</b> <math>=</math> area of cross section <math>\times</math> length</p> 
<p><b>Volume of cylinder</b> <math>= \pi r^2 h</math></p> <p><b>Curved surface area of cylinder</b> <math>= 2\pi r h</math></p> 	<p><b>Volume of sphere</b> <math>= \frac{4}{3}\pi r^3</math></p> <p><b>Surface area of sphere</b> <math>= 4\pi r^2</math></p> 

**Answer ALL TWENTY FOUR questions.**

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

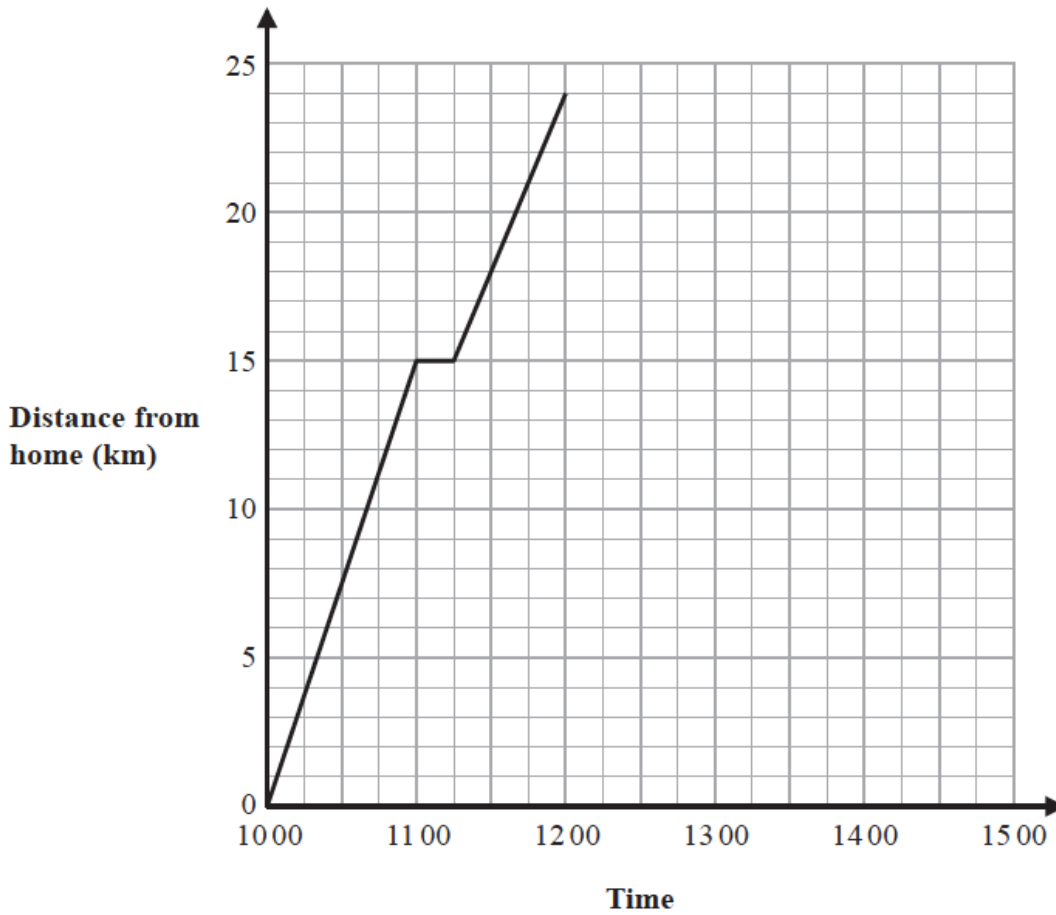
**You must write down all the stages in your working.**

**1** Show that  $4\frac{2}{3} \div 1\frac{1}{9} = 4\frac{1}{5}$

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

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- 2 Jalina left her home at 10 00 to cycle to a park.  
On her way to the park, she stopped at a friend's house and then continued her journey to the park.  
Here is the distance-time graph for her journey to the park.



- (a) On her journey to the park, did Jalina cycle at a faster speed before or after she stopped at her friend's house?  
Give a reason for your answer.

.....

.....

.....

(1)

Jalina stayed at the park for 45 minutes.  
She then cycled, without stopping, at a constant speed of 16 km/h from the park back to her home.

(b) Show all this information on the distance-time graph.

(2)

(c) Work out Jalina's average cycling speed, in kilometres per hour, for the complete journey to the park and back.  
Do **not** include the times when she was not cycling in your calculation.  
Give your answer correct to 1 decimal place.

..... km/h  
(3)

(Total for Question 2 is 6 marks)

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3 (a) Simplify  $e^9 \div e^5$

.....  
(1)

(b) Simplify  $(y^2)^8$

.....  
(1)

(c) Expand and simplify  $(x + 9)(x - 2)$

.....  
(2)

(d) Factorise fully  $16c^4p^2 + 20cp^3$

.....  
(2)

**(Total for Question 3 is 6 marks)**

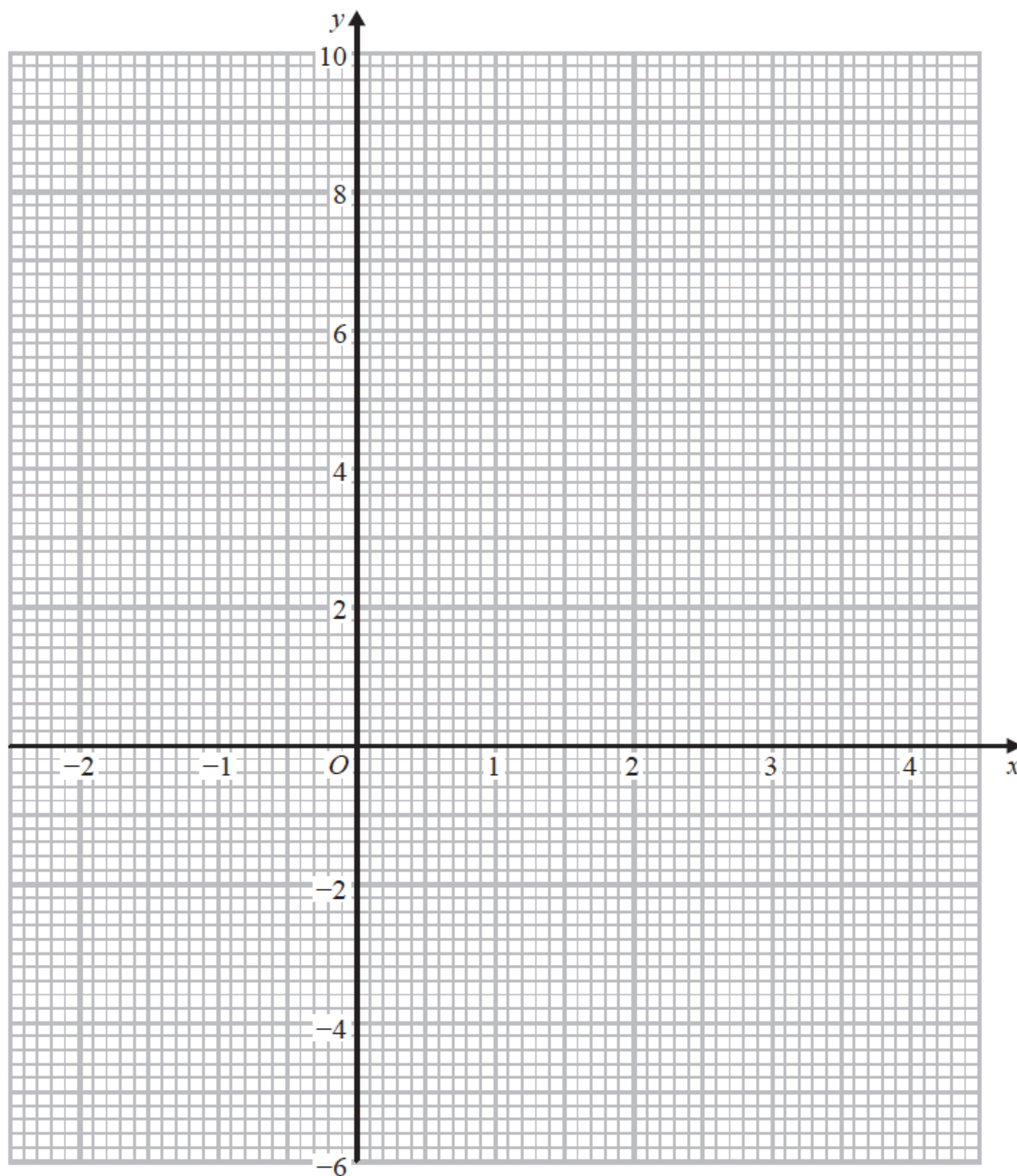
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4 (a) Complete the table of values for  $y = x^2 - 3x - 1$

$x$	-2	-1	0	1	2	3	4
$y$			-1		-3		3

(2)

(b) On the grid, draw the graph of  $y = x^2 - 3x - 1$  for all values of  $x$  from -2 to 4



(2)

(Total for Question 4 is 4 marks)





5 Becky has a biased 6-sided dice.

The table gives information about the probability that, when the dice is thrown, it will land on each number.

<b>Number</b>	1	2	3	4	5	6
<b>Probability</b>	$2x$	0.18	$2x$	$3x$	0.26	$x$

Becky is going to throw the dice 200 times.

Work out an estimate for the number of times that the dice will land on an even number.

.....  
**(Total for Question 5 is 4 marks)**

6 The diagram shows a solid cuboid made from wood.

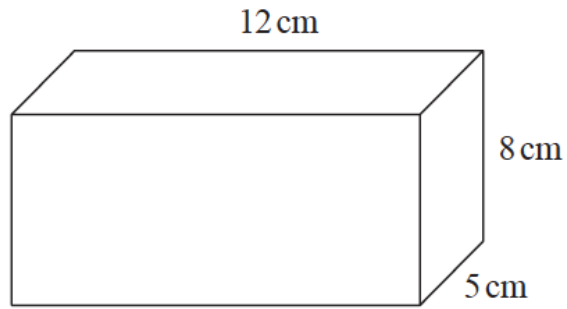


Diagram **NOT**  
accurately drawn

The wood has density  $0.7 \text{ g/cm}^3$

Work out the mass of the cuboid.

..... grams

**(Total for Question 6 is 3 marks)**

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7 (a) Write  $5.7 \times 10^6$  as an ordinary number.

.....  
(1)

(b) Write 0.004 in standard form.

.....  
(1)

(c) Work out  $\frac{2 \times 10^4 + 3 \times 10^5}{6.4 \times 10^{-2}}$

.....  
(2)

**(Total for Question 7 is 4 marks)**

---

8 On 1st January 2016 Li bought a boat for \$170 000  
The value of the boat depreciates by 8% per year.  
Work out the value of the boat on 1st January 2019  
Give your answer correct to the nearest dollar.

\$ .....

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

- 9 The diagram shows a shape made from a right-angled triangle and a semicircle.

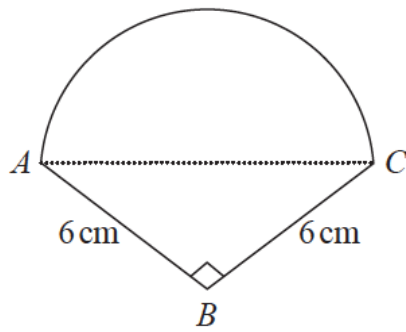


Diagram **NOT**  
accurately drawn

$AC$  is the diameter of the semicircle.  
 $BA = BC = 6$  cm  
Angle  $ABC = 90^\circ$

Work out the area of the shape.  
Give your answer correct to 1 decimal place.

..... cm<sup>2</sup>

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

**10**  $A = 2^n \times 3 \times 5^m$

Write  $8A$  as a product of powers of its prime factors.

.....  
**(Total for Question 10 is 2 marks)**

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**11**  $C = b - a$

$a = 6$  correct to the nearest integer

$b = 15$  correct to the nearest 5

Work out the upper bound for the value of  $C$   
Show your working clearly.

.....  
**(Total for Question 11 is 3 marks)**

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12 (a) Factorise  $2x^2 - 7x + 6$

.....  
(2)

(b) Solve  $\frac{4m+9}{3} = 7 - 2m$

Show clear algebraic working.

$m =$  .....  
(4)

(c) Write  $\frac{\sqrt[4]{y}}{y}$  in the form  $y^b$  where  $b$  is a fraction.

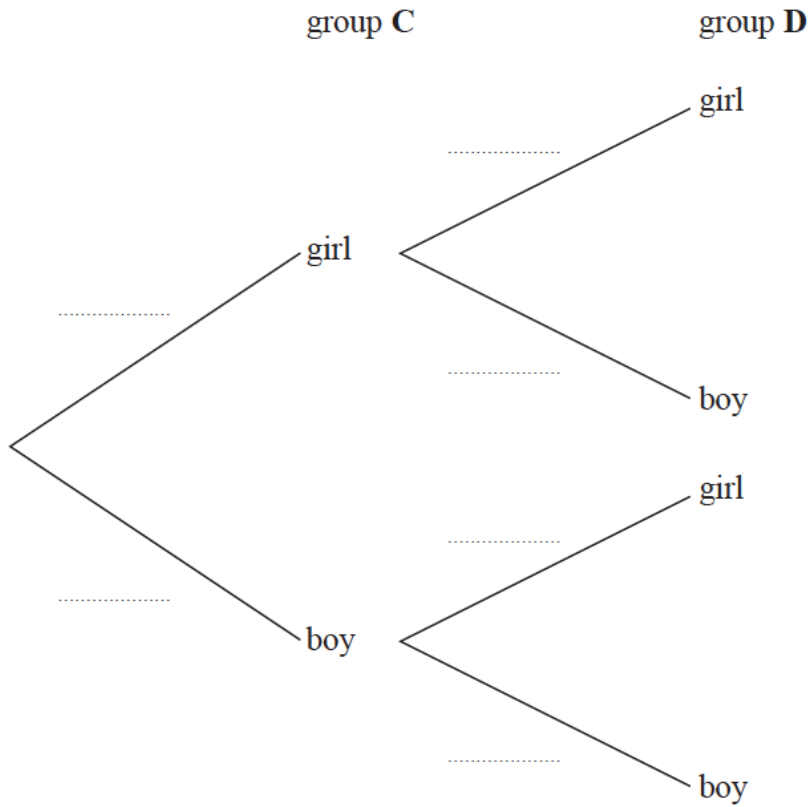
.....  
(2)

(Total for Question 12 is 8 marks)

- 13** In group **C**, there are 6 girls and 8 boys.  
In group **D**, there are 3 girls and 7 boys.

A team is made by picking at random one child from group **C** and one child from group **D**.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that there are two boys in the team.

.....  
(2)

After the first team has been picked, a second team is picked.  
One child is picked at random from the children left in group **C** and one child is picked at random from the children left in group **D**.

(c) Work out the probability that there are two boys in each of the two teams.

.....  
(3)

**(Total for Question 13 is 7 marks)**

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- 14**  $\mathcal{E} = \{\text{positive integers less than 20}\}$   
 $A = \{x : x < 12\}$   
 $B = \{x : 7 \leq x < 16\}$

(a) List the members of  $A \cap B$

.....  
(2)

$C$  is a set such that  $C \subset A$  and  $n(C) = 3$

Given that all members of  $C$  are even numbers,

(b) list the members of one possible set  $C$ .

.....  
(1)

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

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15 Use algebra to show that the recurring decimal  $0.2\dot{5}4 = \frac{14}{55}$

(Total for Question 15 is 2 marks)

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16 Here are the first five terms of an arithmetic sequence.

7      10      13      16      19

Find the sum of the first 100 terms of this sequence.

.....  
(Total for Question 16 is 2 marks)

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17 A and B are two similar vases.

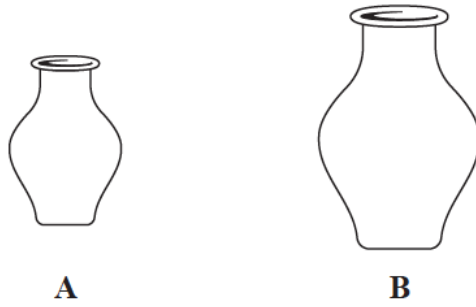


Diagram **NOT**  
accurately drawn

Vase **A** has height 24 cm.

Vase **B** has height 36 cm.

Vase **A** has a surface area of  $960 \text{ cm}^2$

(a) Work out the surface area of vase **B**.

.....  $\text{cm}^2$   
(2)

Vase **B** has a volume of  $V \text{ cm}^3$

(b) Find in terms of  $V$ , an expression for the volume, in  $\text{cm}^3$ , of vase **A**.

.....  $\text{cm}^3$   
(2)

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

18 The diagram shows triangle  $PQR$ .

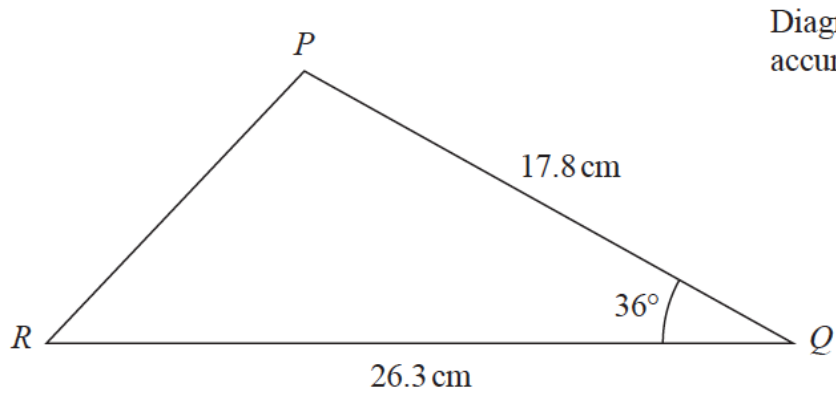


Diagram **NOT** accurately drawn

Calculate the length of  $PR$ .  
Give your answer correct to 3 significant figures.

..... cm

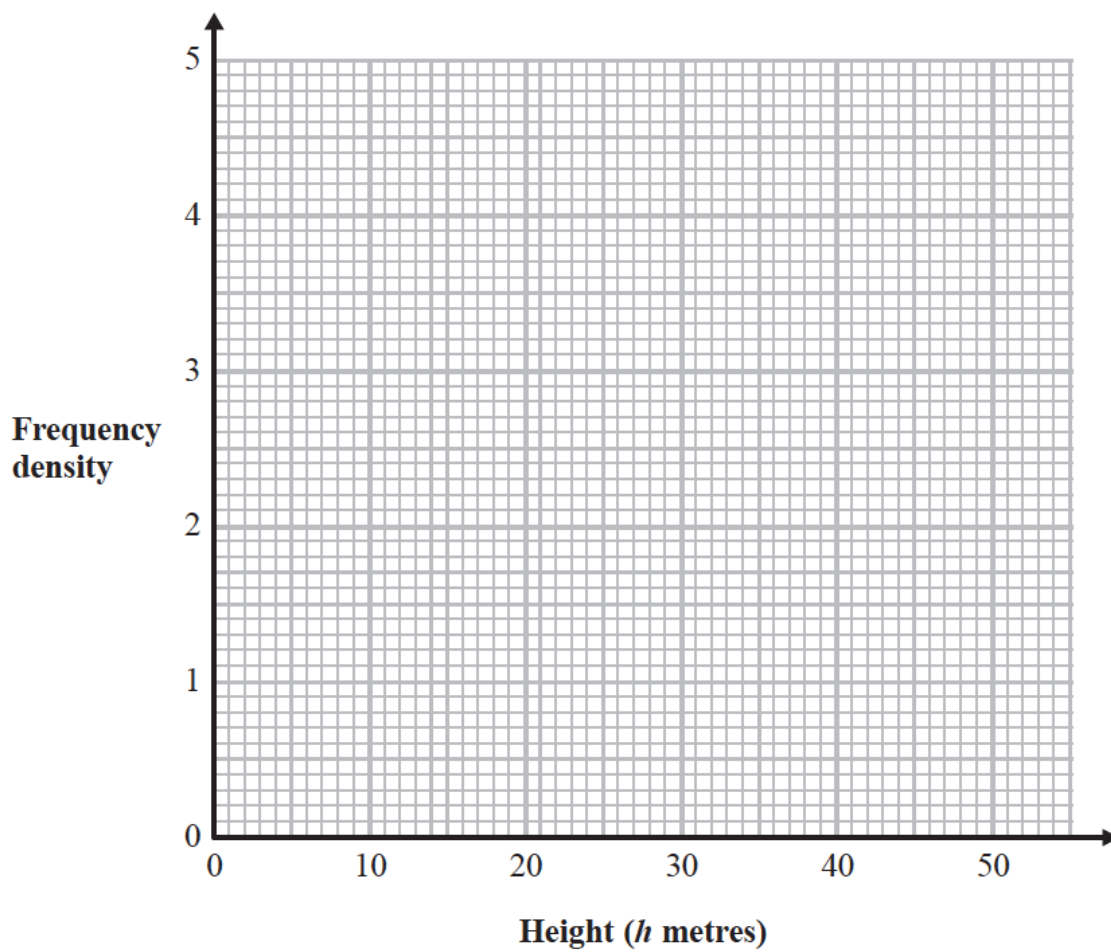
**(Total for Question 18 is 3 marks)**

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19 The table gives information about the heights of some trees.

Height ( $h$ metres)	Frequency
$0 < h \leq 20$	15
$20 < h \leq 35$	48
$35 < h \leq 40$	21
$40 < h \leq 50$	16

On the grid, draw a histogram for this information.



(Total for Question 19 is 3 marks)

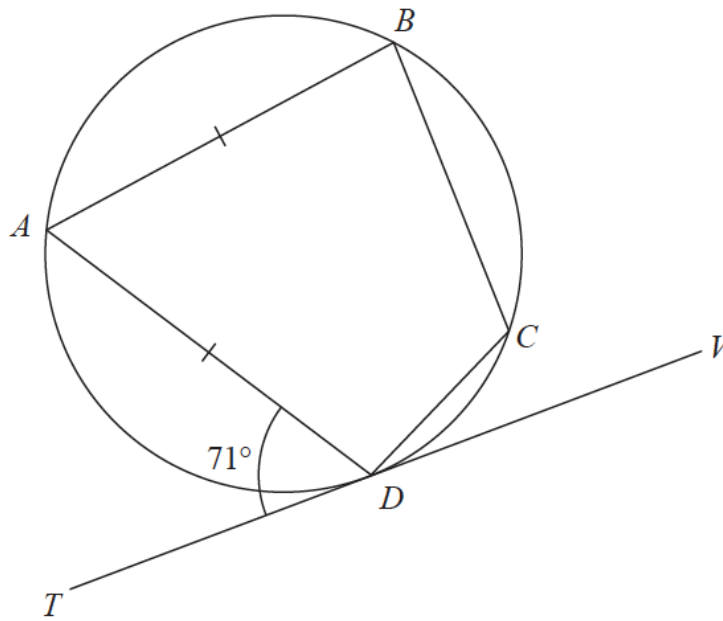


Diagram **NOT** accurately drawn

$A, B, C$  and  $D$  are points on a circle.  
 $TDV$  is the tangent to the circle at  $D$ .

$AB = AD$   
 Angle  $ADT = 71^\circ$

Work out the size of angle  $BCD$ .  
 Give a reason for each stage of your working.

.....<sup>o</sup>  
**(Total for Question 20 is 5 marks)**

- 21 A solid is made from a hemisphere and a cylinder.  
The plane face of the hemisphere coincides with the upper plane face of the cylinder.

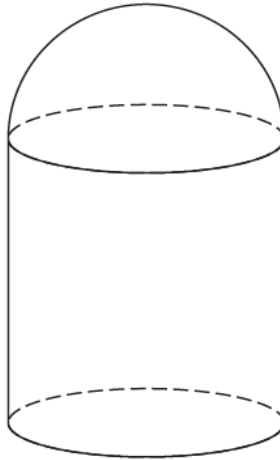


Diagram **NOT**  
accurately drawn

The hemisphere and the cylinder have the same radius.

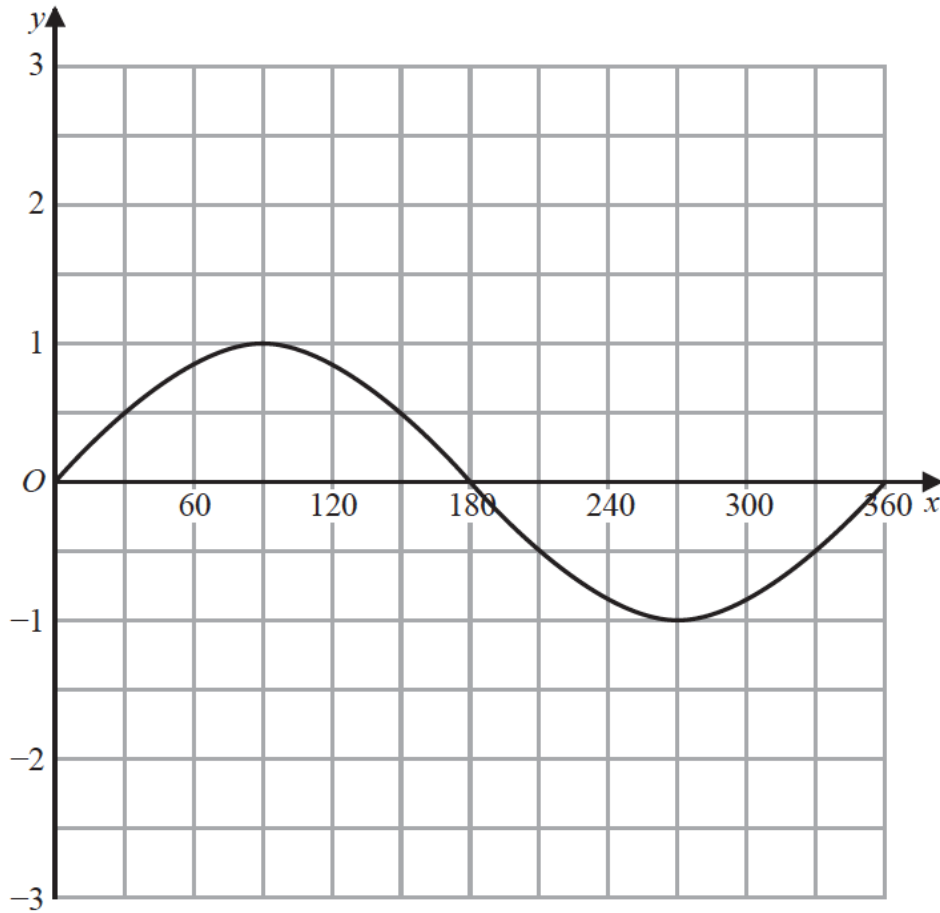
The ratio of the radius of the cylinder to the height of the cylinder is 1 : 3

Given that the solid has volume  $792\pi \text{ cm}^3$   
work out the height of the solid.

..... cm

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

22 The graph of  $y = \sin x^\circ$  for  $0 \leq x \leq 360$  is drawn on the grid.



(a) On the grid, draw the graph of  $y = 2 \sin (x + 30)^\circ$  for  $0 \leq x \leq 360$  (2)

(b) (i) Write  $x^2 - 6x + 10$  in the form  $(x - a)^2 + b$  where  $a$  and  $b$  are integers.

..... (2)

(ii) Hence, describe fully the single transformation that maps the curve with equation  $y = x^2$  onto the curve with equation  $y = x^2 - 6x + 10$

.....  
 ..... (2)

**(Total for Question 22 is 6 marks)**

**23**  $ABCD$  is a kite with  $AB = AD$  and  $CB = CD$ .

$B$  is the point with coordinates  $(10, 19)$

$D$  is the point with coordinates  $(2, 7)$

Find an equation of the line  $AC$ .

Give your answer in the form  $py + qx = r$  where  $p$ ,  $q$  and  $r$  are integers.

.....  
**(Total for Question 23 is 5 marks)**

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- 24 A particle  $P$  is moving along a straight line that passes through the fixed point  $O$ . The displacement,  $s$  metres, of  $P$  from  $O$  at time  $t$  seconds is given by

$$s = t^3 - 6t^2 + 5t - 4$$

Find the value of  $t$  for which the acceleration of  $P$  is  $3 \text{ m/s}^2$

$t = \dots\dots\dots$

**(Total for Question 24 is 4 marks)**

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**TOTAL FOR PAPER IS 100 MARKS**