

Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						5	5	2	5	/	0	6	Signature	

Paper Reference(s)

5525/06

Edexcel GCSE

Mathematics A – 1387

Paper 6 (Calculator)

Higher Tier

Monday 11 June 2007 – Morning

Time: 2 hours



Examiner's use only

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Team Leader's use only

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Materials required for examination

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

Items included with question papers

Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature. Check that you have the correct question paper. Answer ALL the questions. Write your answers in the spaces provided in this question paper. **You must NOT write on the formulae page. Anything you write on the formulae page will gain NO credit.** If you need more space to complete your answer to any question, use additional answer sheets.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2). There are 25 questions in this question paper. The total mark for this paper is 100. There are 24 pages in this question paper. Any blank pages are indicated. **Calculators may be used.** If your calculator does not have a  $\pi$  button, take the value of  $\pi$  to be 3.142 unless the question instructs otherwise.

Advice to Candidates

Show all stages in any calculations. Work steadily through the paper. Do not spend too long on one question. If you cannot answer a question, leave it and attempt the next one. Return at the end to those you have left out.

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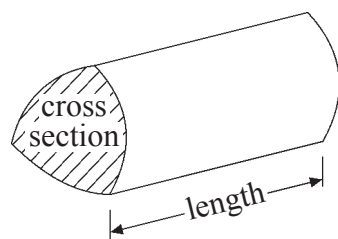
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GCSE Mathematics 1387/8

Formulae: Higher Tier

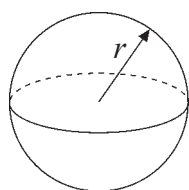
**You must not write on this formulae page.**  
**Anything you write on this formulae page will gain NO credit.**

**Volume of a prism** = area of cross section  $\times$  length



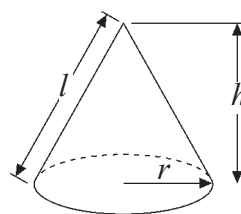
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

**Surface area of sphere** =  $4\pi r^2$

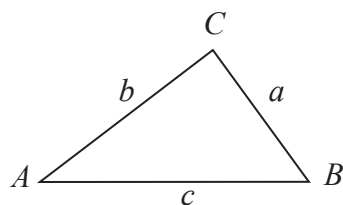


**Volume of cone** =  $\frac{1}{3}\pi r^2 h$

**Curved surface area of cone** =  $\pi r l$



**In any triangle ABC**



**The Quadratic Equation**

The solutions of  $ax^2 + bx + c = 0$

where  $a \neq 0$ , are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**Sine Rule**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** =  $\frac{1}{2}ab \sin C$





<p style="text-align: center;"><b>Answer ALL TWENTY FIVE questions.</b></p> <p style="text-align: center;"><b>Write your answers in the spaces provided.</b></p> <p style="text-align: center;"><b>You must write down all stages in your working.</b></p> <p><b>1.</b> A shop sells CDs and DVDs. In one week the number of CDs sold and the number of DVDs sold were in the ratio 3:5 The total number of CDs and DVDs sold in the week was 728</p> <p>Work out the number of CDs sold.</p> <p style="text-align: right;">.....</p> <p style="text-align: right;"><b>(Total 2 marks)</b></p>	<p>Leave blank</p> <p><b>Q1</b></p> <div></div>
<p><b>2.</b> Here are the first 4 terms of an arithmetic sequence.</p> <p style="text-align: center;">2            5            8            11</p> <p>Find an expression, in terms of <math>n</math>, for the <math>n</math>th term of the sequence.</p> <p style="text-align: right;">.....</p> <p style="text-align: right;"><b>(Total 2 marks)</b></p>	<p><b>Q2</b></p> <div></div>



M 2 5 7 6 7 A 0 3 2 4



<p>3. The equation</p> $x^3 - x = 30$ <p>has a solution between 3 and 4 Use a trial and improvement method to find this solution. Give your answer correct to 1 decimal place. You must show <b>all</b> your working.</p> <p><math>x = \dots\dots\dots</math></p> <p>(Total 4 marks)</p>	<p>Leave blank</p> <p><b>Q3</b></p> <input data-bbox="1614 1768 1656 1837" type="text"/>
<p>4. Seejal says</p> <p>“If <math>a</math> and <math>b</math> are prime numbers greater than 2, then <math>a \times b</math> is always an odd number.”</p> <p>Is Seejal correct? .....</p> <p>Give reasons for your answer.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>(Total 2 marks)</p>	<p><b>Q4</b></p> <input data-bbox="1614 2318 1656 2386" type="text"/>





<p>5.</p> <div data-bbox="730 602 1184 911"></div> <p>Diagram <b>NOT</b> accurately drawn</p> <p>A rectangular television screen has a width of 45 cm and a height of 34 cm.</p> <p>Work out the length of the diagonal of the screen.</p> <p>Give your answer correct to the nearest centimetre.</p> <p>..... cm</p> <p>(Total 4 marks)</p>	<p>Leave blank</p> <p>Q5</p> <div></div>
<p>6. James invested £2000 for three years in an Internet Savings Account.</p> <p>He is paid 5.5% per annum <b>compound</b> interest.</p> <p>Work out the <b>total interest</b> earned after three years.</p> <p>£ .....</p> <p>(Total 3 marks)</p>	<p>Q6</p> <div></div>



M 2 5 7 6 7 A 0 5 2 4



**Q7**

In a competition for radio controlled boats, a competitor has to steer a boat so that its path between  $AB$  and  $CD$  is a straight line  
this path is always the same distance from  $A$  as from  $B$

Scale: 1 cm represents 10 metres

(2)

(b) Shade this practice region on the map.

**(Total 4 marks)**





8. The table gives some information about the time taken by a group of 100 students to complete an IQ test.

Time ( $t$ seconds)	Frequency	
$60 < t \leq 70$	12	
$70 < t \leq 80$	22	
$80 < t \leq 90$	23	
$90 < t \leq 100$	24	
$100 < t \leq 110$	19	

Calculate an estimate for the mean time taken by the students.

..... seconds

(Total 4 marks)

Q8

9. A plane flies 1400 kilometres in 2 hours 20 minutes.

Calculate the average speed, in km/h, of the plane.

..... km/h

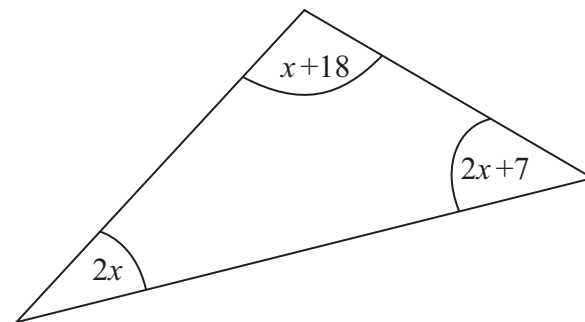
(Total 3 marks)

Q9



10.

Diagram **NOT**  
accurately drawn



The sizes of the angles, in degrees, of the triangle are

$2x + 7$   
 $2x$   
 $x + 18$

(a) Use this information to write down an equation in terms of  $x$ .

.....  
(2)

(b) Use your answer to part (a) to work out the value of  $x$ .

$x =$  .....  
(2)

(Total 4 marks)

Leave  
blank

Q10



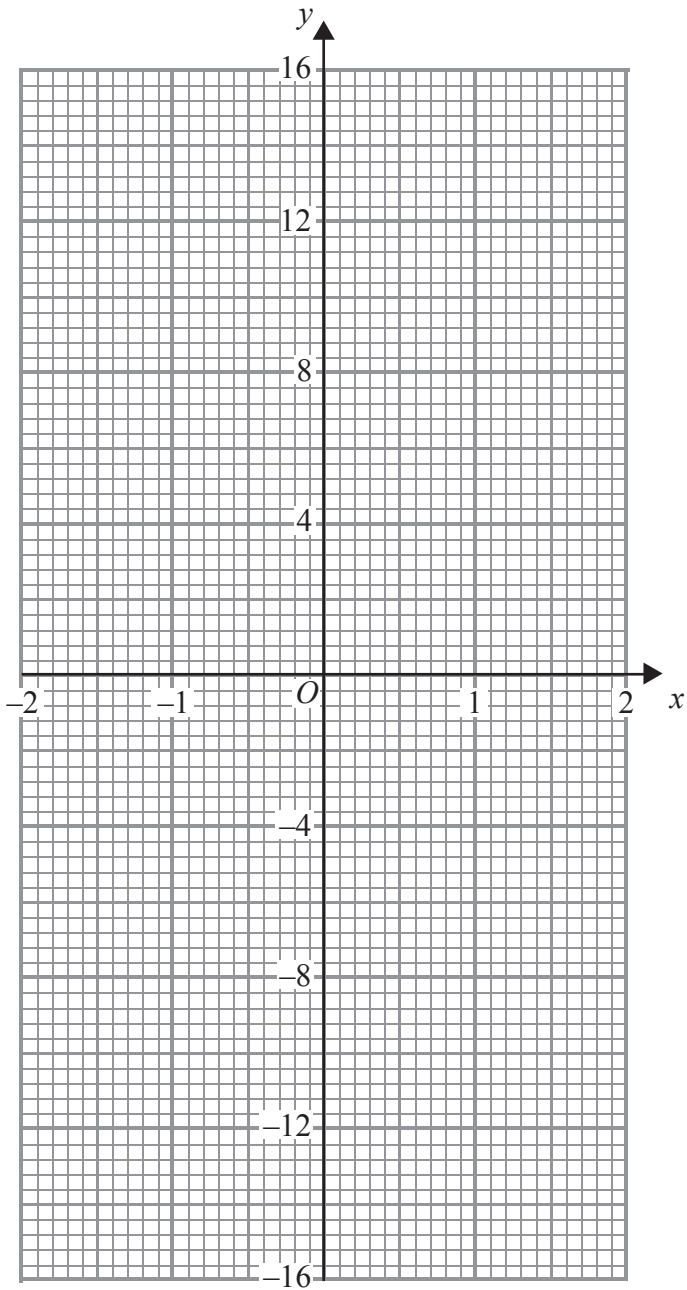


11. (a) Complete the table of values for  $y = x^3 + 3x$

$x$	-2	-1	0	1	2
$y$	-14		0		

(2)

(b) On the grid, draw the graph of  $y = x^3 + 3x$



(2)

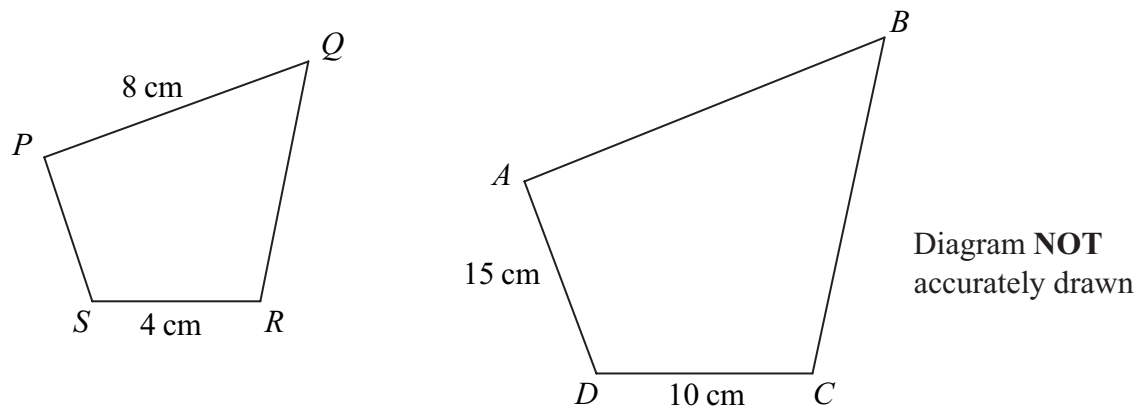
Q11

(Total 4 marks)



Leave  
blank

12. The diagram shows two quadrilaterals that are mathematically **similar**.



In quadrilateral  $PQRS$ ,  $PQ = 8$  cm,  $SR = 4$  cm.  
In quadrilateral  $ABCD$ ,  $AD = 15$  cm,  $DC = 10$  cm.  
Angle  $PSR =$  angle  $ADC$ .  
Angle  $SPQ =$  angle  $DAB$ .

(a) Calculate the length of  $AB$ .

..... cm  
(2)

(b) Calculate the length of  $PS$ .

..... cm  
(2)

(Total 4 marks)

Q12



<p><b>13.</b> In 2003 the population of Great Britain was <math>6.0 \times 10^7</math> In 2003 the population of India was <math>9.9 \times 10^8</math></p> <p>(a) Work out the difference between the population of India and the population of Great Britain in 2003. Give your answer in standard form.</p> <p>..... (2)</p> <p>In 1933 the population of Great Britain was <math>4.5 \times 10^7</math></p> <p>(b) Calculate the percentage increase in the population of Great Britain from 1933 to 2003. Give your answer correct to one decimal place.</p> <p>..... % (3)</p> <p>(Total 5 marks)</p>	<p>Leave blank</p> <p><b>Q13</b></p> <div></div>
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<p><b>14.</b> Martin is organising a summer fair. He needs bread buns and burgers for the barbecue.</p> <p>Bread buns are sold in packs. Each pack contains 40 bread buns. Burgers are sold in packs. Each pack contains 24 burgers. Martin buys exactly the same number of bread buns as burgers.</p> <p>What is the least number of each pack that Martin buys?</p> <p>..... packs of bread buns</p> <p>..... packs of burgers</p> <p><b>(Total 3 marks)</b></p>	<p>Leave blank</p> <p><b>Q14</b></p> <div></div>
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15.

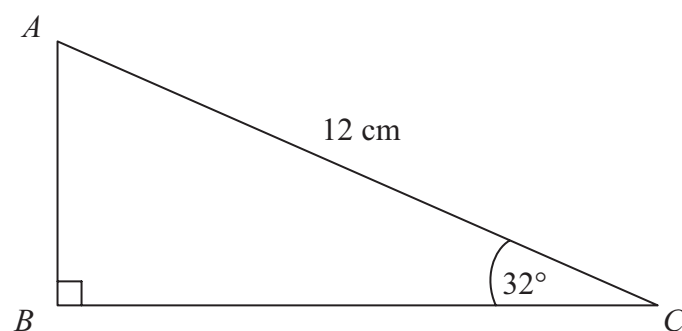


Diagram **NOT**  
accurately drawn

$AC = 12 \text{ cm}$ .  
Angle  $ABC = 90^\circ$ .  
Angle  $ACB = 32^\circ$ .

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

..... cm

(Total 3 marks)

Leave  
blank

**Q15**



<p><b>16.</b> The mean of eight numbers is 41 The mean of two of the numbers is 29</p> <p>What is the mean of the other six numbers?</p>	Leave blank
	<div>Q16</div> <div></div>

.....  
(Total 3 marks)



**Q17**

(b) Expand and simplify  $(2x + 5)(3x - 4)$

(2)

(2)

(2)

Find the value of  $q$  when  $p = 6$  and  $t = 5$

**Q17**

**Turn over**



<p><b>18.</b> In a spring, the tension (<math>T</math> newtons) is directly proportional to its extension (<math>x</math> cm).</p> <p>When the tension is 150 newtons, the extension is 6 cm.</p> <p>(a) Find a formula for <math>T</math> in terms of <math>x</math>.</p> <p style="text-align: right;"><math>T = \dots\dots\dots</math> <b>(3)</b></p> <p>(b) Calculate the tension, in newtons, when the extension is 15 cm.</p> <p style="text-align: right;"><math>\dots\dots\dots</math> newtons <b>(1)</b></p> <p>(c) Calculate the extension, in cm, when the tension is 600 newtons.</p> <p style="text-align: right;"><math>\dots\dots\dots</math> cm <b>(1)</b></p> <p style="text-align: right;"><b>(Total 5 marks)</b></p>	<p>Leave blank</p> <p><b>Q18</b></p>





**Q19**

**Q20**

**Turn over**

**Turn over**

**Turn over**

**Turn over**

**Turn over**

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**Turn over**



21.

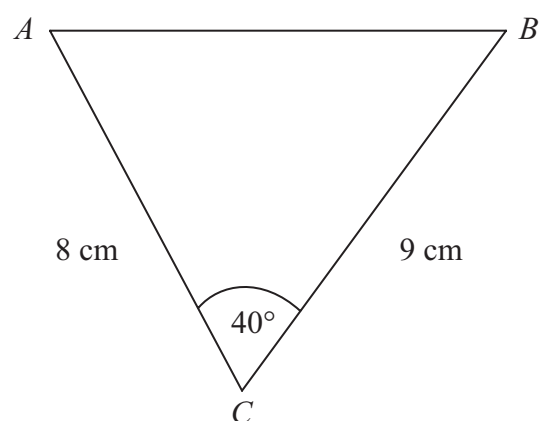


Diagram **NOT**  
accurately drawn

$ABC$  is a triangle.  
 $AC = 8$  cm.  
 $BC = 9$  cm.  
Angle  $ACB = 40^\circ$ .

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

Leave  
blank

..... cm

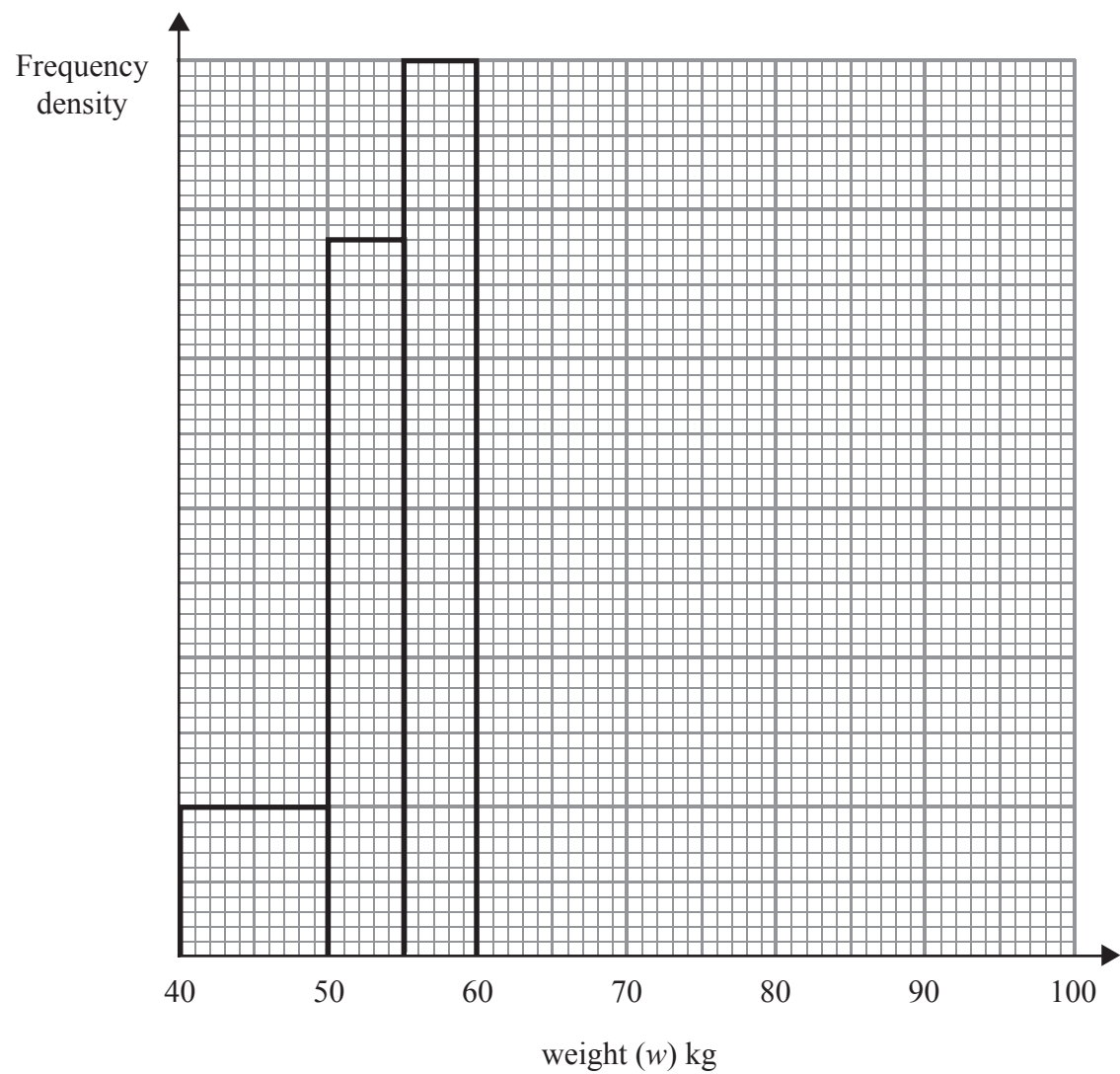
**Q21**

**(Total 3 marks)**



Leave  
blank

22. The incomplete table and histogram give some information about the weights of people at a keep-fit session.



- (a) Use the information in the histogram to complete the frequency table.

Weight ( $w$ ) kg	Frequency
$40 \leq w < 50$	10
$50 \leq w < 55$	
$55 \leq w < 60$	
$60 \leq w < 75$	15
$75 \leq w < 95$	8

(2)

- (b) Complete the histogram.

(2)

(Total 4 marks)

Q22



<p><b>23.</b> Kelly runs a distance of 100 metres in a time of 10.52 seconds.</p> <p>The distance of 100 metres was measured to the nearest metre. The time of 10.52 seconds was measured to the nearest hundredth of a second.</p> <p>(a) Write down the upper bound for the distance of 100 metres.</p> <p>..... metres <b>(1)</b></p> <p>(b) Write down the lower bound for the time of 10.52 seconds.</p> <p>..... seconds <b>(1)</b></p> <p>(c) Calculate the upper bound for Kelly's average speed. Write down all the figures on your calculator display.</p> <p>..... metres per second <b>(2)</b></p> <p>(d) Calculate the lower bound for Kelly's average speed. Write down all the figures on your calculator display.</p> <p>..... metres per second <b>(2)</b></p> <p><b>(Total 6 marks)</b></p>	<p>Leave blank</p> <p><b>Q23</b></p>





<p><b>24.</b> Martin has a pencil case which contains 4 blue pens and 3 green pens.</p> <p>Martin picks a pen at random from the pencil case. He notes its colour, and then replaces it. He does this two more times.</p> <p>Work out the probability that when Martin takes three pens, exactly two are the same colour.</p>	<p>Leave blank</p> <p><b>Q24</b></p> <div></div>

.....  
(Total 3 marks)



25.

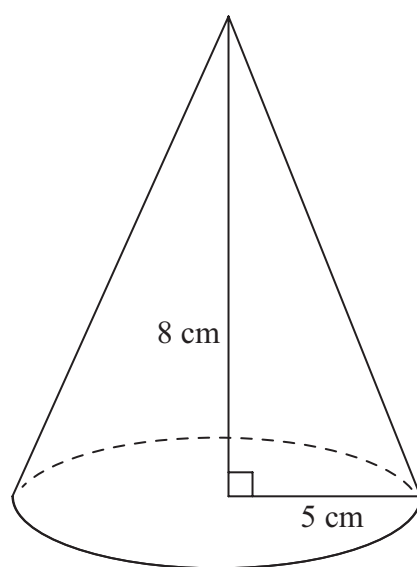


Diagram **NOT**  
accurately drawn

A cone has a base radius of 5 cm and a vertical height of 8 cm.

- (a) Calculate the volume of the cone.  
Give your answer correct to 3 significant figures.

..... cm<sup>3</sup>  
(2)

Leave  
blank



Here is the net of a different cone.

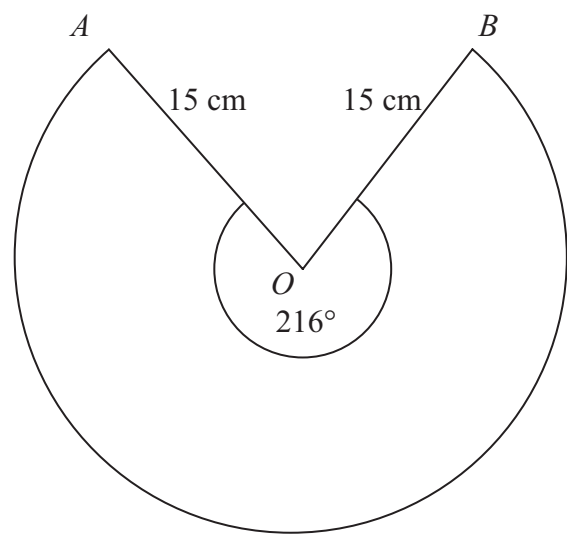


Diagram **NOT**  
accurately drawn

The net is a sector of a circle, centre  $O$ , and radius 15 cm.  
Reflex angle  $AOB = 216^\circ$   
The net makes a cone of slant height 15 cm.

(b) Work out the vertical height of the cone.

..... cm  
(4)

Q25

(Total 6 marks)

TOTAL FOR PAPER: 100 MARKS

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