

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

Friday 9 November 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 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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Turn over

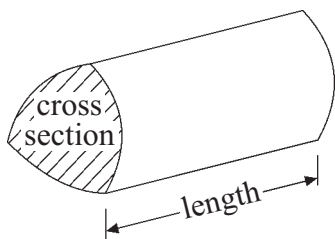
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GCSE Mathematics 1387/8

Formulae: Higher Tier

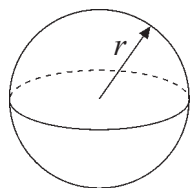
**You must not write on this formulae page.**  
**Anything you write on this formulae page will gain NO credit.**

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



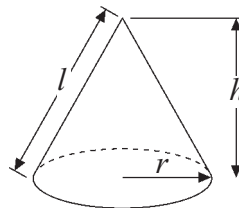
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

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

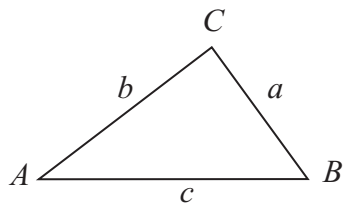


**Volume of cone** =  $\frac{1}{3}\pi r^2 h$

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



**In any triangle ABC**



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

**The Quadratic Equation**

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

where  $a \neq 0$ , are given by

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





<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> In April 2004, the population of the European Community was 376 million.</p> <p>In April 2005, the population of the European Community was 451 million.</p> <p>Work out the percentage increase in population.</p> <p>Give your answer correct to 1 decimal place.</p> <p style="text-align: right;">.....%</p> <p style="text-align: right;"><b>(Total 3 marks)</b></p>	<p>Leave blank</p> <p><b>Q1</b></p> <div></div>
<p><b>2.</b> The equation</p> <p style="text-align: center;"><math>x^3 - 5x = 60</math></p> <p>has a solution between 4 and 5.</p> <p>Use a trial and improvement method to find this solution.</p> <p>Give your answer correct to 1 decimal place.</p> <p>You must show <b>all</b> your working.</p> <p style="text-align: right;">.....</p> <p style="text-align: right;"><b>(Total 4 marks)</b></p>	<p><b>Q2</b></p> <div></div>



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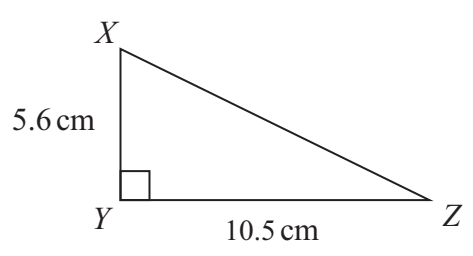


Diagram **NOT**  
accurately drawn

In the triangle  $XYZ$

$$XY = 5.6 \text{ cm}$$

$$YZ = 10.5 \text{ cm}$$

$$\text{angle } XYZ = 90^\circ$$

(a) Work out the length of  $XZ$ .

..... cm  
(3)

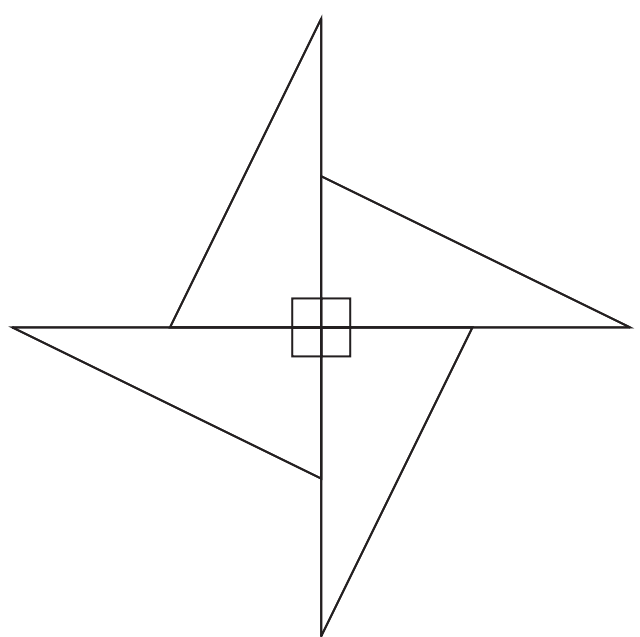


Diagram **NOT**  
accurately drawn

4 copies of the triangle are fitted together to make the shape shown in the diagram.

(b) Calculate the perimeter of the shape.

..... cm  
(2)

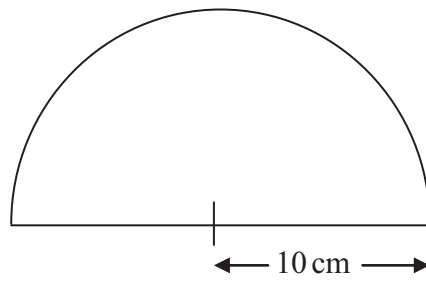
(Total 5 marks)

Q3



4.

Diagram **NOT**  
accurately drawn



The diagram shows a semicircle.  
The radius of the semicircle is 10 cm.

Calculate the area of the semicircle.  
Give your answer correct to 3 significant figures.  
State the units of your answer.

Leave  
blank

.....  
**Q4**

**(Total 3 marks)**



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5. The table gives information about the times, in minutes, that 106 shoppers spent in a supermarket.

Time ( $t$ minutes)	Frequency	
$0 < t \leq 10$	20	
$10 < t \leq 20$	17	
$20 < t \leq 30$	12	
$30 < t \leq 40$	32	
$40 < t \leq 50$	25	

(a) Find the class interval that contains the median.

.....  
(1)

(b) Calculate an estimate for the mean time that the shoppers spent in the supermarket.  
Give your answer correct to 3 significant figures.

..... minutes  
(4)

(Total 5 marks)

Q5



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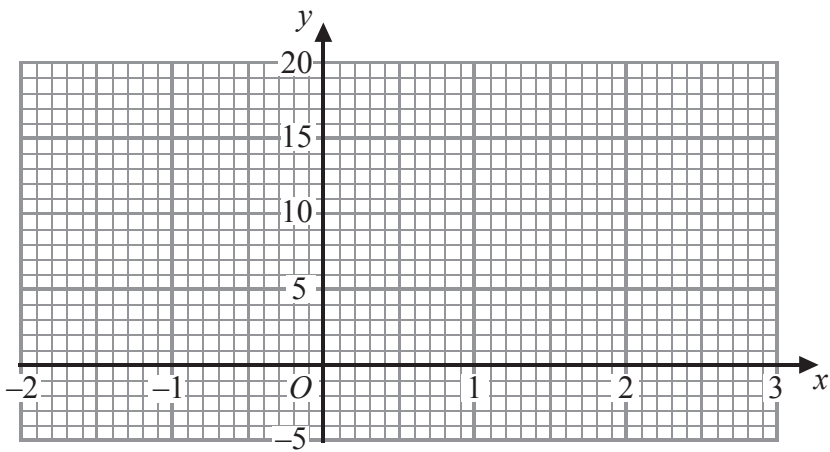
6. (a) Complete the table of values for  $y = 2x^2 - 4x$

$x$	-2	-1	0	1	2	3
$y$	16		0			6

(2)

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

(2)



(c) (i) On the same axes, draw the straight line  $y = 2.5$

(ii) Write down the values of  $x$  for which  $2x^2 - 4x = 2.5$

(2)

Q6

(Total 6 marks)



<p>7. On July 1st 2004, Jack invested £2000 at 5% per annum compound interest.</p> <p>Work out the value of Jack's investment on July 1st 2006</p>	Leave blank
<p>£ .....</p> <p>(Total 3 marks)</p>	Q7 <input type="text"/>
<p>8. Write 720 as a product of its prime factors.</p>	
<p>.....</p> <p>(Total 2 marks)</p>	Q8 <input type="text"/>
<p>9. Simplify (a) <math>p^7 \times p^9</math></p> <p>.....</p> <p>(1)</p> <p>Simplify (b) <math>\frac{q^{12} \times q^4}{q^6}</math></p> <p>.....</p> <p>(1)</p> <p>(Total 2 marks)</p>	Q9 <input type="text"/>





<p><b>10.</b> In a sale, normal prices are reduced by 25%. The sale price of a saw is £12.75</p> <p>Calculate the normal price of the saw.</p>	Leave blank	
<p>£ .....</p> <p><b>(Total 3 marks)</b></p>	<b>Q10</b> <input type="text"/>	
<p><b>11.</b> Work out</p> $\frac{2 \times 2.2 \times 10^{12} \times 1.5 \times 10^{12}}{2.2 \times 10^{12} - 1.5 \times 10^{12}}$ <p>Give your answer in standard form correct to 3 significant figures.</p>	<p>.....</p> <p><b>(Total 3 marks)</b></p>	<b>Q11</b> <input type="text"/>
<p><b>12.</b> Solve</p> $\begin{aligned} 3x + y &= 8 \\ 4x + 2y &= 9 \end{aligned}$	<p><math>x =</math> .....</p> <p><math>y =</math> .....</p> <p><b>(Total 3 marks)</b></p>	<b>Q12</b> <input type="text"/>



13.

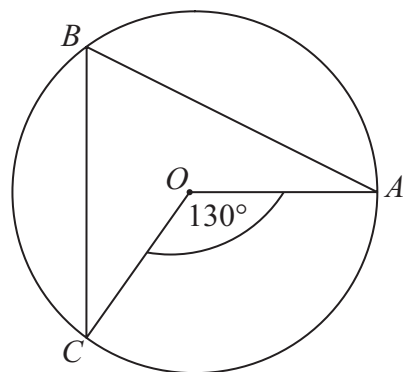


Diagram **NOT**  
accurately drawn

- (a) In the diagram,  $O$  is the centre of the circle.  
 $A$ ,  $B$  and  $C$  are points on the circle.

Angle  $COA = 130^\circ$ .

- (i) Find the size of angle  $CBA$ .

.....  
°

- (ii) Give a reason for your answer.

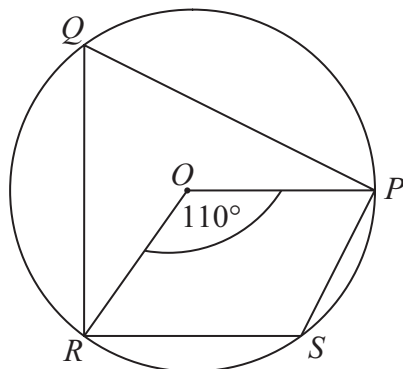
.....  
.....

(2)



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Diagram **NOT**  
accurately drawn



- (b) In the diagram,  $O$  is the centre of the circle.  
 $P$ ,  $Q$ ,  $R$  and  $S$  are points on the circle.

Angle  $ROP = 110^\circ$

Calculate the size of angle  $RSP$ .

.....  
(2)

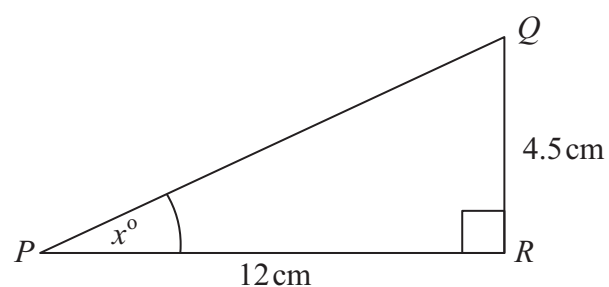
(Total 4 marks)

Q13



14.

Diagram **NOT**  
accurately drawn



$PQR$  is a right-angled triangle.  
 $PR = 12$  cm.  
 $QR = 4.5$  cm.  
Angle  $PRQ = 90^\circ$ .

Work out the value of  $x$ .  
Give your answer correct to one decimal place.

$x = \dots\dots\dots$

**Q14**

**(Total 3 marks)**

15.  $A = \frac{h(x+10)}{2}$

$A = 27$   
 $h = 4$

Work out the value of  $x$ .

$x = \dots\dots\dots$

**Q15**

**(Total 3 marks)**





16.

Month	Jan	Feb	Mar	Apr	May	Jun
Number of Televisions	1240	1270	1330	1300	1330	$x$

The table shows the number of televisions sold in a shop in the first five months of 2006.

(a) Work out the first 3-month moving average for the information in the table.

.....

(2)

The fourth 3-month moving average of the number of televisions sold in 2006 is 1350  
The number of televisions sold in the shop in June was  $x$ .

(b) Work out the value of  $x$ .

$x =$ .....

(2)

(Total 4 marks)

Leave blank

Q16



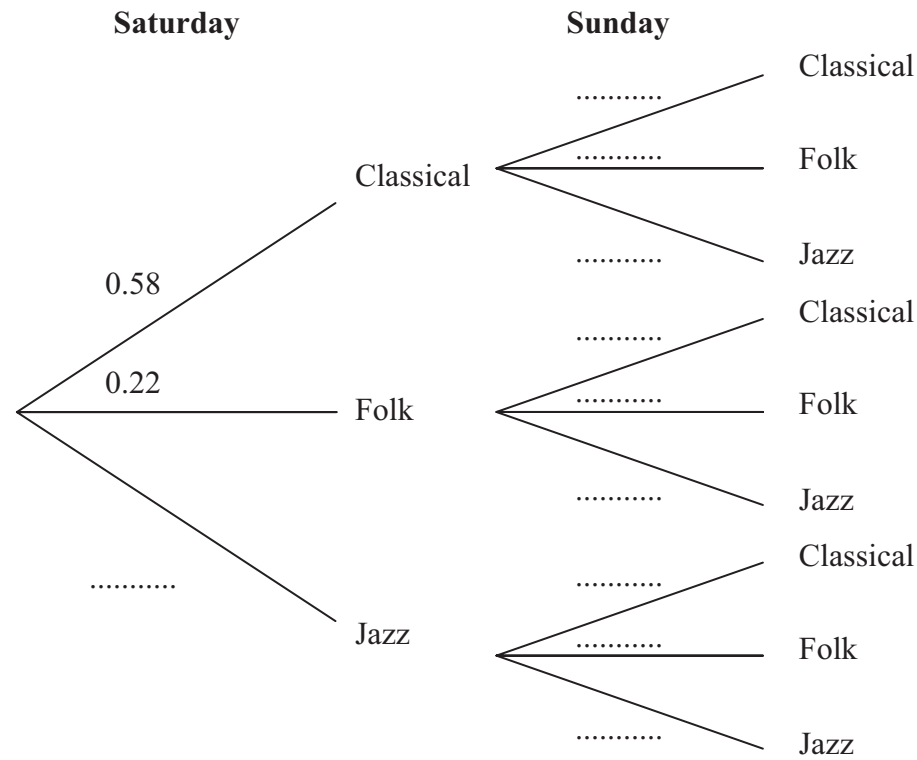
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17. Julie has 100 music CDs.  
58 of the CDs are classical.  
22 of the CDs are folk.  
The rest of the CDs are jazz.

On Saturday, Julie chooses one CD at random from the 100 CDs.  
On Sunday, Julie chooses one CD at random from the 100 CDs.

- (a) Complete the probability tree diagram.

(2)



- (b) Calculate the probability that Julie will choose a jazz CD on **both** Saturday and Sunday.

(2)

- (c) Calculate the probability that Julie will choose at least one jazz CD on Saturday **and** Sunday.

(3)

(Total 7 marks)

Q17





<p><b>18.</b> <math>f</math> is inversely proportional to <math>d</math>.</p> <p>When <math>d = 50, f = 256</math></p> <p>Find the value of <math>f</math> when <math>d = 80</math></p> <p><math>f = \dots\dots\dots</math></p> <p><b>(Total 3 marks)</b></p>	<p>Leave blank</p> <p><b>Q18</b></p> <div></div>



N 2 9 1 0 6 A 0 1 5 2 4



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19. The diagram shows a 6-sided shape.  
All the corners are right angles.  
All the measurements are given in centimetres.

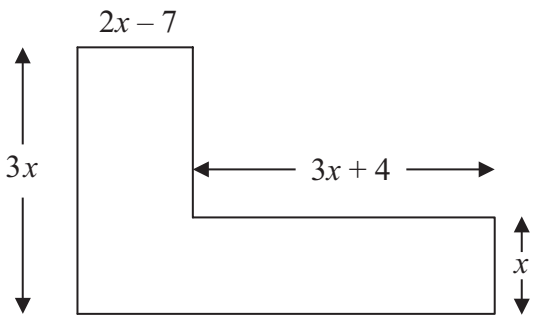


Diagram **NOT**  
accurately drawn

The area of the shape is  $85 \text{ cm}^2$ .

- (a) Show that  $9x^2 - 17x - 85 = 0$

(3)

- (b) (i) Solve  $9x^2 - 17x - 85 = 0$

Give your solutions correct to 3 significant figures.

$x = \dots\dots\dots$  or  $x = \dots\dots\dots$

- (ii) Hence, work out the length of the shortest side of the 6-sided shape.

$\dots\dots\dots \text{ cm}$   
(4)

(Total 7 marks)

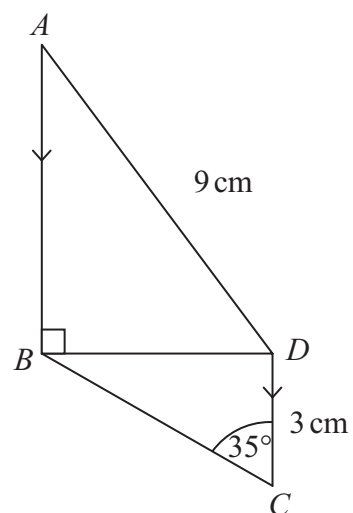
Q19





20.

Diagram **NOT**  
accurately drawn



$AB$  is parallel to  $DC$ .

$AD = 9\text{ cm}$ ,  $DC = 3\text{ cm}$ .

Angle  $BCD = 35^\circ$ .

Angle  $ABD = 90^\circ$ .

Calculate the size of angle  $BAD$ .  
Give your answer correct to one decimal place.

Leave  
blank

Q20

(Total 4 marks)



21. The diagram shows an equilateral triangle.

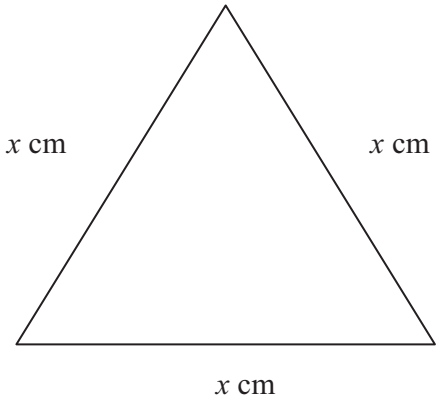


Diagram **NOT** accurately drawn

The area of the equilateral triangle is 36 cm<sup>2</sup>.  
Find the value of  $x$ .  
Give your answer correct to 3 significant figures.

$x =$  .....

(Total 3 marks)

Leave blank

Q21

22. (a) Simplify  $(2x^4y^5)^3$

.....  
(2)



$$y = \frac{2pt}{p-t}$$

(b) Rearrange the formula to make  $t$  the subject.

Leave  
blank

$$t = \dots \quad (4)$$

Q22

**(Total 6 marks)**

**23.** The mass  $M$  grams of a cube with edges of length  $L$  cm and density  $D$  grams per  $\text{cm}^3$  is given by the formula

$$M = DL^3$$

$D = 8$  correct to 1 significant figure.

$L = 6.4$  correct to 1 decimal place.

Calculate the upper bound of  $M$ .

Give your answer correct to 2 significant figures.

Q23

**(Total 3 marks)**



24.  $x^2 - 8x + 23 = (x - p)^2 + q$  for all values of  $x$ .

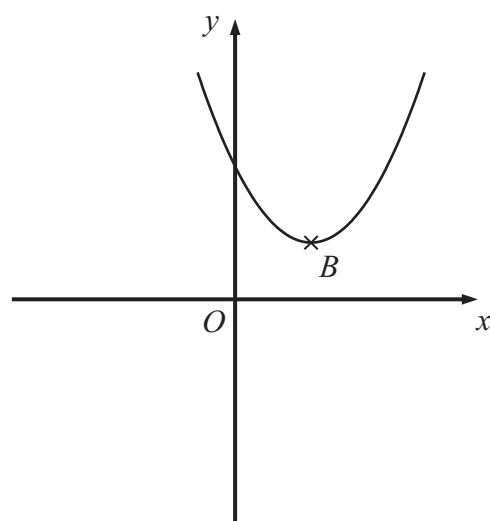
(a) Find the value of  $p$  and the value of  $q$ .

$p = \dots\dots\dots$

$q = \dots\dots\dots$

**(3)**

Here is a sketch of the curve with equation  $y = x^2 - 8x + 23$



$B$  is the minimum point on the curve.

(b) Find the coordinates of  $B$ .

(..... , .....)

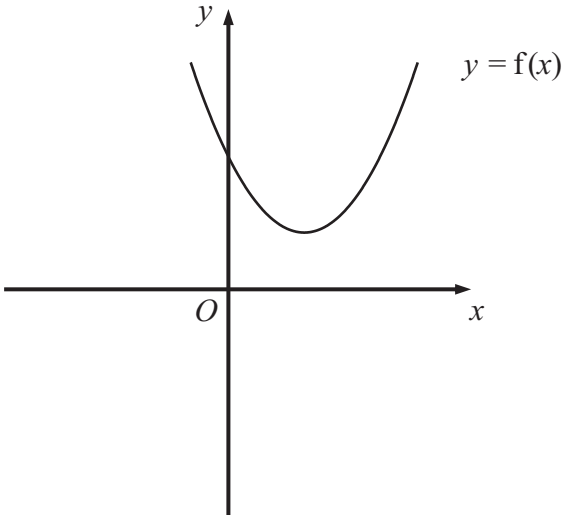
**(1)**





The equation of the curve can be written in the form  $y = f(x)$ , where  $f(x) = x^2 - 8x + 23$

(c) On the diagram below, draw a sketch of the curve  $y = f(-x)$ .



Leave  
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(1)

Q24

(Total 5 marks)

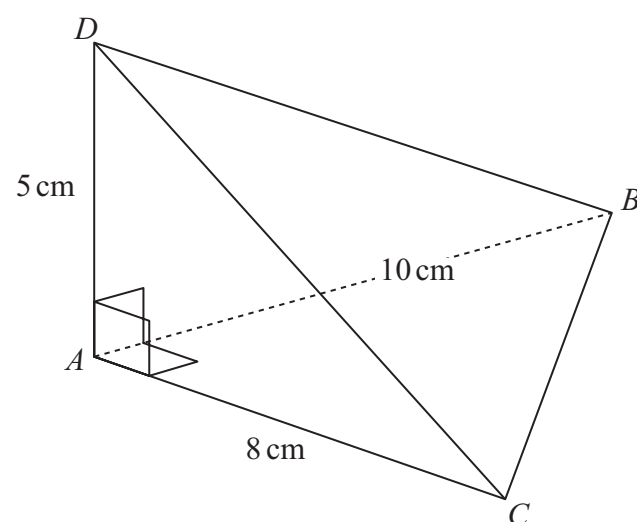


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25.

Diagram **NOT**  
accurately drawn



The diagram shows a tetrahedron.  
 $AD$  is perpendicular to both  $AB$  and  $AC$ .  
 $AB = 10$  cm.  
 $AC = 8$  cm.  
 $AD = 5$  cm.  
Angle  $BAC = 90^\circ$ .

Calculate the size of angle  $BDC$ .  
Give your answer correct to 1 decimal place.

Leave  
blank

Q25

(Total 6 marks)

TOTAL FOR PAPER: 100 MARKS

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