Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						7	3	6	1	/	0	1	Signature	

Paper Reference(s)

7361/01

Examiner's use only

Team Leader's use only

London Examinations GCE

Mathematics Syllabus B

Ordinary Level

Paper 1

Tuesday 13 January 2009 – Afternoon

Time: 1 hour 30 minutes

Materials required for examination
Nil

Items included with question papers
Nil

Candidates are expected to have an electronic calculator when answering this paper.

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 write your answer for each question in the spaces following the question.
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)**.
Full marks may be obtained for answers to ALL questions.
There are 29 questions in this question paper. The total mark for this paper is 100.
There are 20 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

Write your answers clearly and legibly.

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1. Write down $\frac{1}{16}$ as

(a) a decimal,

.....

(1)

(b) a percentage.

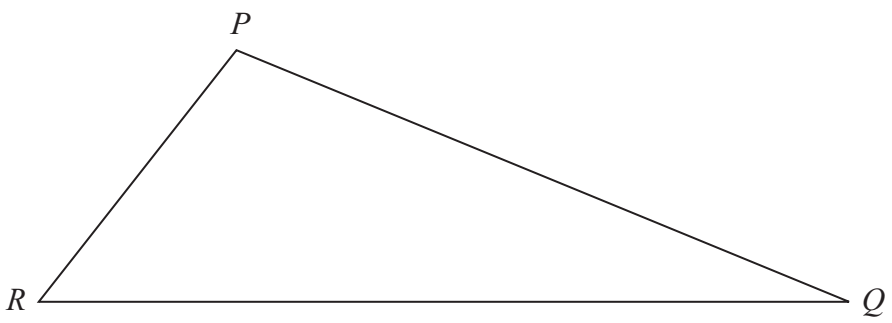
.....

(1)

Q1

(Total 2 marks)

2.



On the diagram, draw the line which is equidistant from PQ and PR.

Q2

(Total 2 marks)

3. Solve the inequality $4x - 1 > \frac{x}{3} + 10$

Q3

.....

(Total 2 marks)

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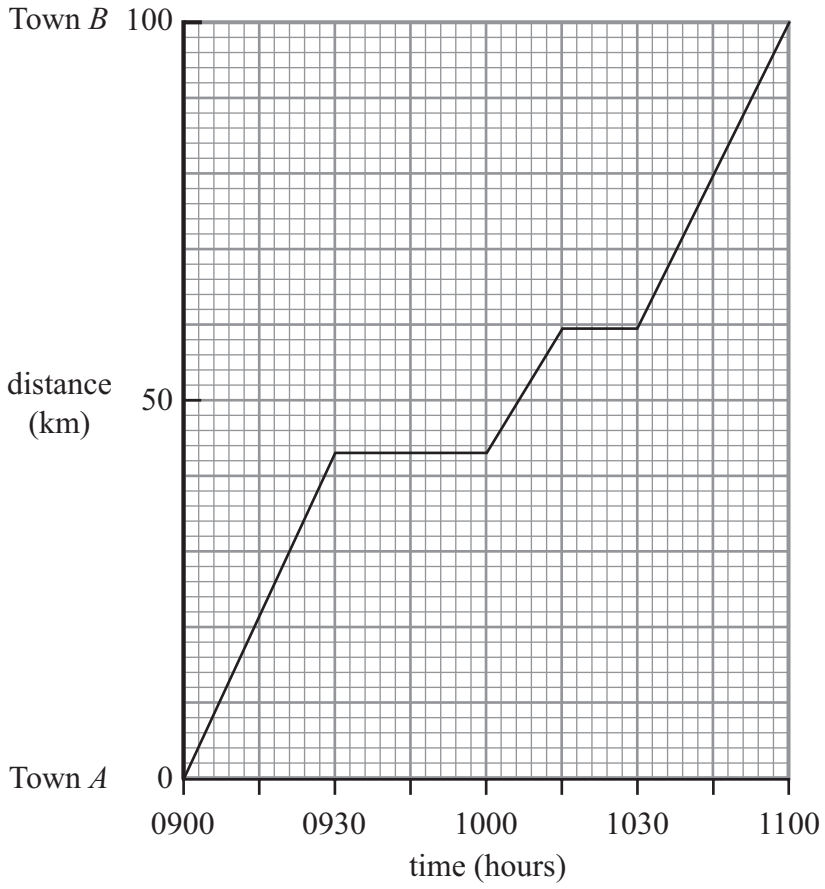
4.



The diagram shows the distance-time graph of a train travelling from town *A* to town *B*.

Write down the total time in minutes that

(a) the train was moving,

..... minutes
(1)

(b) the train was stationary.

..... minutes
(1)

(Total 2 marks)

Q4

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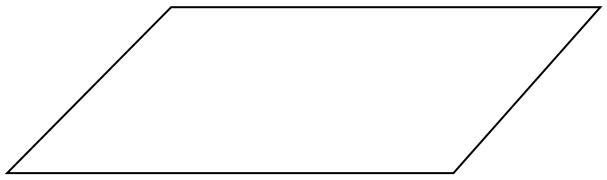
5. The figure shows a parallelogram.



For this parallelogram, write down

(a) the number of lines of symmetry,

.....

(1)

(b) the order of rotational symmetry.

.....

(1)

Q5

(Total 2 marks)

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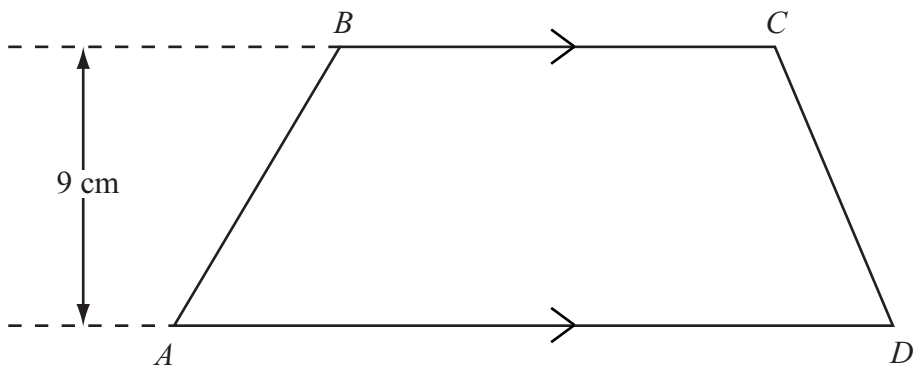
6.



ABCD is a trapezium in which sides *AD* and *BC* are parallel. The perpendicular distance between *AD* and *BC* is 9 cm, and the area of *ABCD* is 54 cm^2.

Calculate the area, in cm^2, of a mathematically similar trapezium in which the distance between the parallel sides is 4.5 cm.

..... cm^2

Q6

(Total 2 marks)

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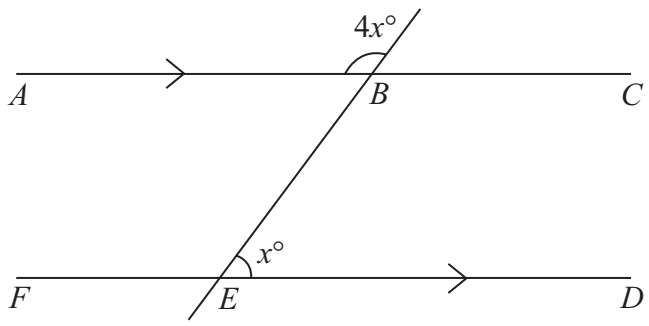
7.



In the diagram, the straight lines *ABC* and *FED* are parallel. Find the value of x in the diagram.

x = ...

(Total 2 marks)

Q7

8. The nth term of a sequence is $2n - 1$. Calculate the sum of the 6th term and the 15th term of the sequence.

.....

(Total 2 marks)

Q8

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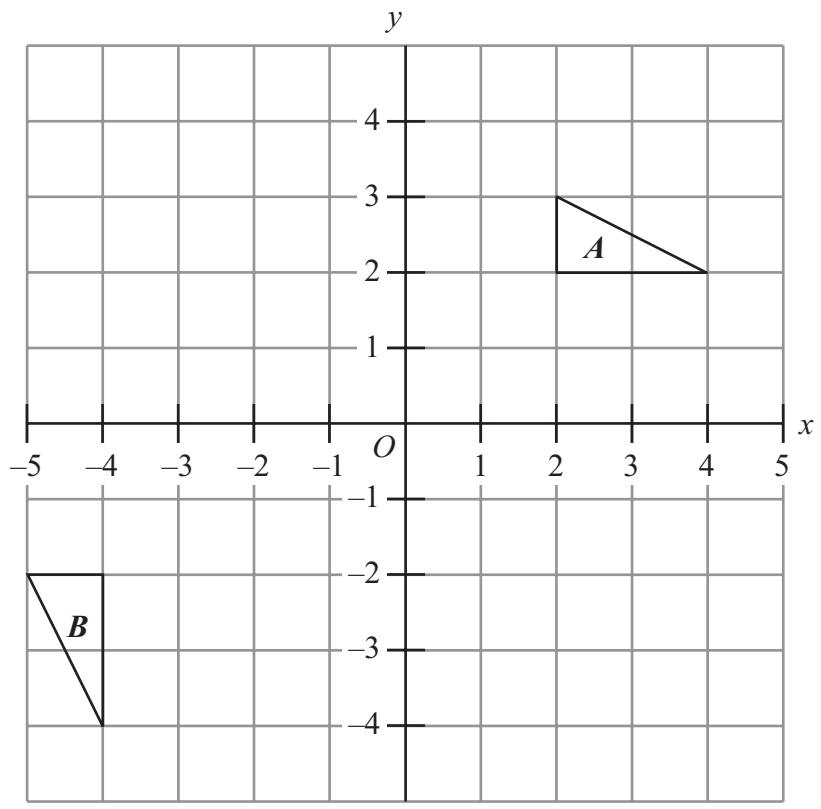
9.



Triangle B is the image of triangle A after a rotation through $w°$ clockwise about O, followed by a reflection in the line $x = a$.

Find the value of w and the value of a.

$w =$ .....

$a =$ .....

(Total 2 marks)

Q9

10. A pie chart is drawn showing information about the cars produced in a factory.
The size of the angle of the sector representing red cars is 126°.
The total number of cars produced is 1000

Calculate the number of red cars produced.

.....

(Total 3 marks)

Q10

Leave blank

11. Find the x-coordinate of the point of intersection of the two straight lines
$y - 3x + 4 = 0$ and $y = 3 - 2x$.

$x =$ .....

(Total 3 marks)

Q11

12. P and Q are two points on a straight road with Q due south of P. A mast M is due east of P. A cyclist travels along the road starting from P at a constant speed of 18 km/ h. After 30 minutes the cyclist arrives at Q.

(a) Write down the distance, in km, that the cyclist travels.

..... km

(1)

The bearing of M from Q is 050°.

(b) Calculate the distance, in km to 3 significant figures, of Q from M.

..... km

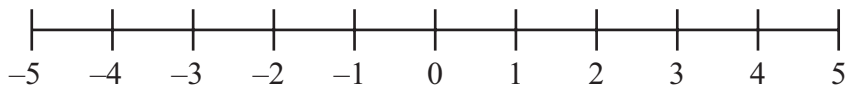
(2)

(Total 3 marks)

Q12

Leave blank

13.



(a) Represent $-2 < x < 1$ on the number line, using the appropriate symbol for each end point.

(2)

$-2 < x < 1$, where x is an integer.

(b) Write down the possible values of x.

$x =$ .....

(1)

(Total 3 marks)

Q13

14. The numbers of fish caught by the fishermen in a village on 11 days were

241, 191, 203, 272, 354, 426, 513, 162, 153, 177, 234

(a) Write down the median number of fish caught.

.....

(1)

(b) Calculate the mean number of fish caught.

.....

(2)

(Total 3 marks)

Q14

15. Factorise completely $3x^3 + 2x^2 - x$.

Q15

.....

(Total 3 marks)

Turn over

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16. Calculate the gradient of the curve $y = x^3 - 2x + \frac{1}{x}$ at the point $(2, 4\frac{1}{2})$.

.....

(Total 3 marks)

Q16

17.

$\mathscr{E} = \{2, 4, 5, 9, 10, 13, 15\}$,

$A = \{$ even numbers $\}$,

$B = \{$ odd numbers $\}$,

$C = \{$ prime numbers $\}$.

List the elements of

(a) $A \cap C'$,

.....

(1)

(b) $A \cap (B \cup C)$,

.....

(1)

(c) $A' \cap (B' \cup C')$.

.....

(1)

(Total 3 marks)

Q17

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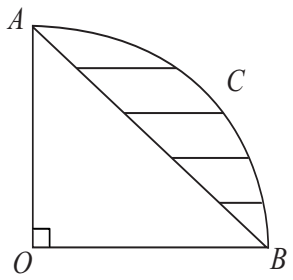
18.



In the diagram, *OACB* is a sector of a circle centre *O*. The chord *AB* has length 10 cm and $\angle AOB = 90°$.

Calculate the area, in cm^2 to 3 significant figures, of the shaded segment.

..... cm^2

(Total 4 marks)

Q18

19. Given that y varies inversely as the square of x and that $y = 375$ when $x = 2$, calculate the value of y when $x = 5$.

$y =$ .....

(Total 4 marks)

Q19

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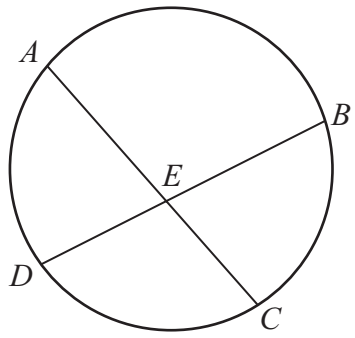
20.



The diagram shows a circle $ABCD$. The chords AC and BD intersect at E.

(a) Show that ΔAED is similar to ΔBEC.

(2)

(b) Hence show that $AE \times BC = BE \times AD$.

(2) **Q20**

(Total 4 marks)

Leave blank

21. Make x the subject of $y = \dfrac{x+ay}{a-x} + \dfrac{1}{a}$. Simplify your answer.

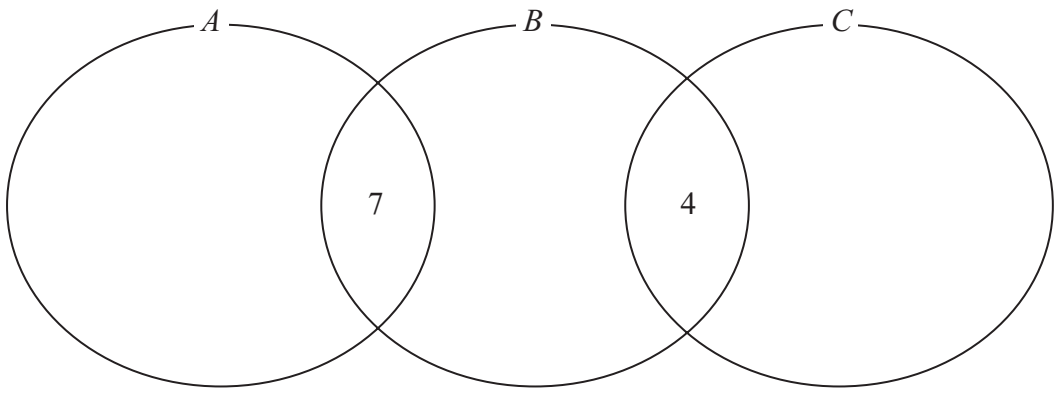
x = ...

(Total 4 marks)

Q21

Leave blank

22.



The Venn diagram shows three sets A, B and C, where $n(A) = 18$, $n(A \cap B) = 7$, $n(B \cap C) = 4$, $n(A \cup B) = 27$ and $n(B \cup C) = 32$.

Find

(a) $n(B)$,

.....

(2)

(b) $n(A \cup B \cup C)$.

.....

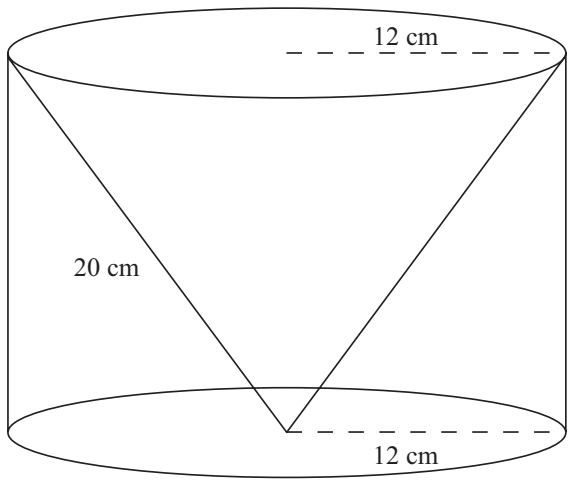
(2)

Q22

(Total 4 marks)

Leave blank

23.



A solid, S, made of wood, is formed by removing a right circular cone from a right circular cylinder. The radius of the cylinder is 12 cm, the radius of the cone is 12 cm and the slant height of the cone is 20 cm. The cone and the cylinder have the same height.

Calculate the volume, in cm^3 to 3 significant figures, of the wood in S.

..... cm^3

(Total 4 marks)

Q23

24. Find the values of x that satisfy the matrix equation

$$(-10 \quad 13)\begin{pmatrix} x^2 \\ x \end{pmatrix} = (-3).$$

.....

(Total 5 marks)

Q24

Leave blank

25. A mixture of sand and cement weighed 25 kg. The mixture contained 3 kg of cement.

(a) Calculate the percentage of cement in this mixture.

..... %
(1)

x kg of water and x kg of cement are now added to the 25 kg to form a new mixture. The ratio weight of sand : total weight of the new mixture is 2: 3

(b) Calculate the value of x.

$x =$ .....
(4)
(Total 5 marks)

Q25

26. $\overrightarrow{OA} = \begin{pmatrix} 7 \\ 7 \end{pmatrix}$, $\overrightarrow{OB} = \begin{pmatrix} 10 \\ 4 \end{pmatrix}$, where O is the origin.

Given that the modulus of $\overrightarrow{AB} = \sqrt{k}$,

(a) calculate the value of k.

$k =$ .....
(2)

(b) Show that ΔOAB is a right angled triangle.

Q26

(3)
(Total 5 marks)

Leave blank

27. The operator * is defined by $r * s = \frac{r+s}{r-s}$.

Solve for x, the equation $(3 * x) = (x * 4)$.

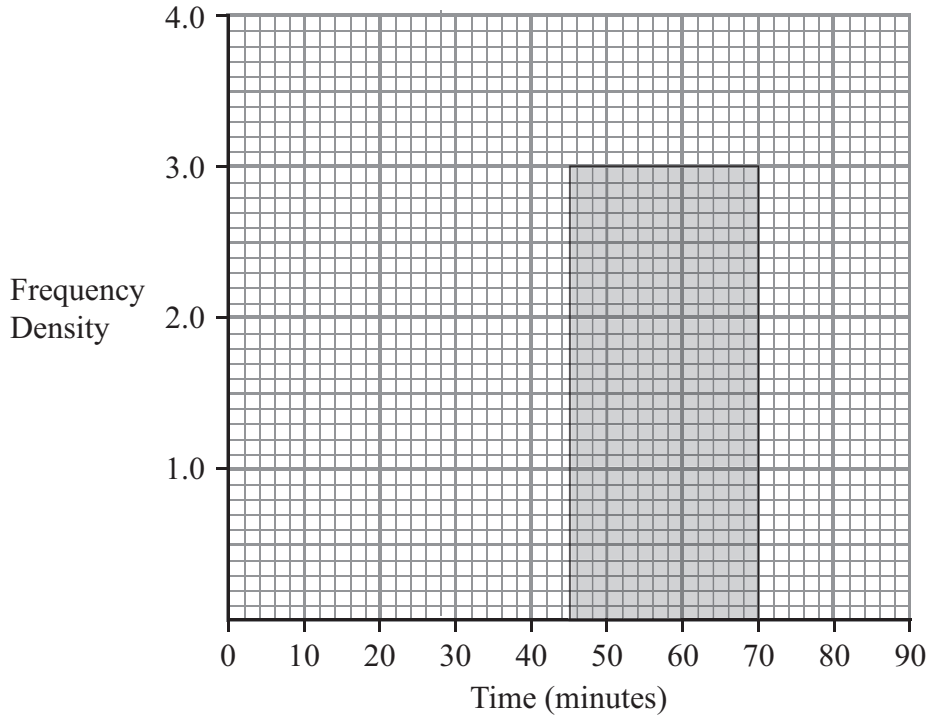
Q27

.....

(Total 6 marks)

Leave blank

28.



185 goals were scored in the matches of a football tournament. The table shows some information about the number of goals scored in particular time intervals of the matches.

Time interval (minutes)	Number of goals scored
$0 < t \leqslant 10$	9
$10 < t \leqslant 25$	21
$25 < t \leqslant 45$	46
$45 < t \leqslant 70$	75
$70 < t \leqslant 90$	34

A histogram is to be drawn to show this information. The frequency density of the bar representing the time interval $45 < t \leqslant 70$ is 3.0, as shown in the diagram.

(a) Complete the histogram.

(4)

(b) Calculate an estimate of the number of goals scored in the first 20 minutes of the matches.

.....

(2)

(Total 6 marks)

Q28

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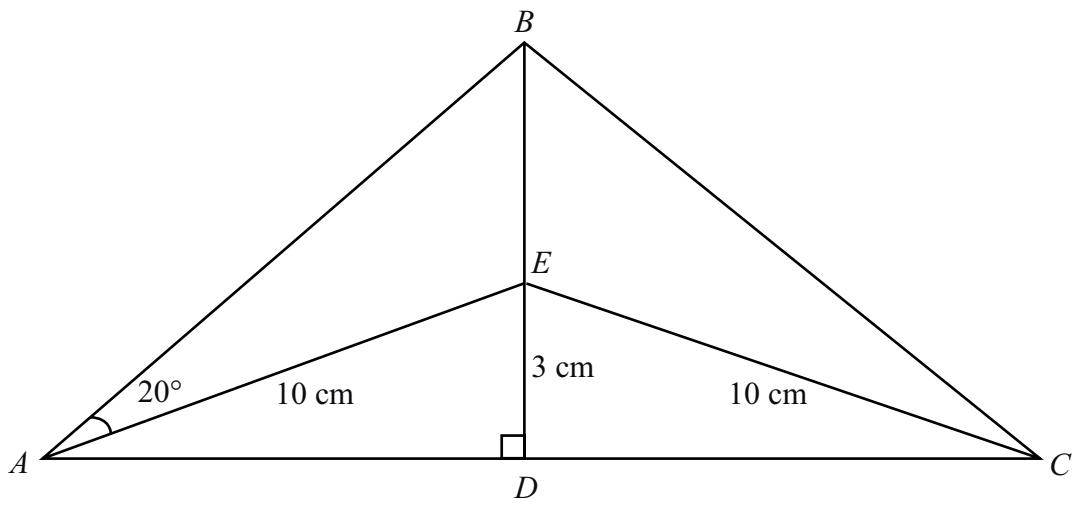
29.



In the diagram, $AE = EC = 10$ cm, $DE = 3$ cm, $\angle BAE = 20°$ and $\angle ADB = 90°$.
DEB and ADC are straight lines.

(a) Calculate the size, in degrees to 3 significant figures, of $\angle EAD$.

.....°

(2)

(b) Calculate the length, in cm to 3 significant figures, of BD.

..... cm

(3)

(c) Calculate the area, in cm^2 to 3 significant figures, of ΔABC.

..... cm^2

(2)

(Total 7 marks)

Q29

TOTAL FOR PAPER: 100 MARKS

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