

Write your name here

Surname

Other names

Pearson Edexcel
International GCSE

Centre Number

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Candidate Number

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Mathematics B

Paper 1



Thursday 26 May 2016 – Morning
Time: 1 hour 30 minutes

Paper Reference

4MB0/01

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.
- Answer the questions in the spaces provided
– there may be more space than you need.
- **Calculators may be used.**

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.
- Without sufficient working, correct answers may be awarded no marks.

Turn over ►

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PEARSON

Answer ALL TWENTY EIGHT questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1** Calculate the gradient of the line joining the points with coordinates $(-3, -4)$ and $(6, -1)$.

.....
(Total for Question 1 is 2 marks)

- 2** Factorise completely $18x^2 - 2y^2$

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

- 3** In 1964 the high jump world record for women was 1.91 metres.
In 1987 it was 2.09 metres.

Calculate, to 3 significant figures, the percentage increase in this world record between 1964 and 1987.

..... %
(Total for Question 3 is 2 marks)

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4 Simplify $\frac{36a^2b^5}{4a^3b^2}$

.....
(Total for Question 4 is 2 marks)

- 5 The bearing of Nashik from Surat is 142°
Find the bearing of Surat from Nashik.

.....
(Total for Question 5 is 2 marks)

- 6 Given that $f(x) = 3 - 2x$
find $ff(x)$ in terms of x . Simplify your answer.

$ff(x) =$

(Total for Question 6 is 2 marks)

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7 $\mathcal{E} = \{a, b, c, d, e, f, g, h, i, j\}$

$A = \{a, b, c, d, e\}$

$B = \{a, c, e, g, i\}$

Find $(A \cup B)'$

(Total for Question 7 is 2 marks)

8

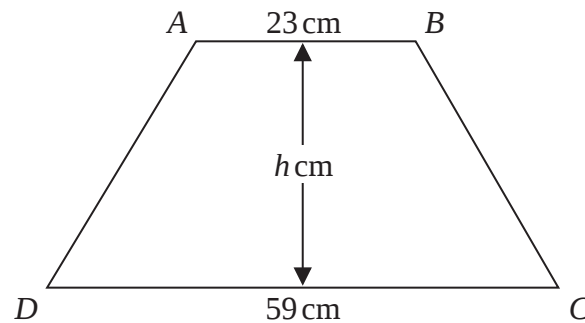


Diagram **NOT** accurately drawn

$ABCD$ is a trapezium with AB parallel to DC .

$AB = 23$ cm, $DC = 59$ cm and the area of $ABCD$ is 574 cm²

Given that h cm is the height of the trapezium, find the value of h .

$h =$

(Total for Question 8 is 2 marks)

9 Write $\frac{3}{x} - \frac{5}{2x}$ as a single fraction. Simplify your answer.

(Total for Question 9 is 2 marks)



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10 $p^2 = 3x - 1$

Simplify $2p^2 - 6x + 7$

(Total for Question 10 is 2 marks)

- 11 The mass M_e of the Earth is 5.9722×10^{24} kg
The mass M_j of the planet Jupiter is 1.8981×10^{27} kg

(a) Find the value of $\frac{M_j}{M_e}$ to the nearest integer.

(1)

(b) Express your answer to part (a) in standard form.

(2)

(Total for Question 11 is 3 marks)

- 12 Solve the equation $2(3x - 4) - 4(1 - 3x) = 3(x + 4)$
Show clear algebraic working.

$x =$

(Total for Question 12 is 3 marks)

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13 Given that $x:y = 5:8$ and that $y:z = 6:7$, find $x:z$

Give your answer in its simplest form.

$x:z = \dots\dots\dots$

(Total for Question 13 is 3 marks)

14

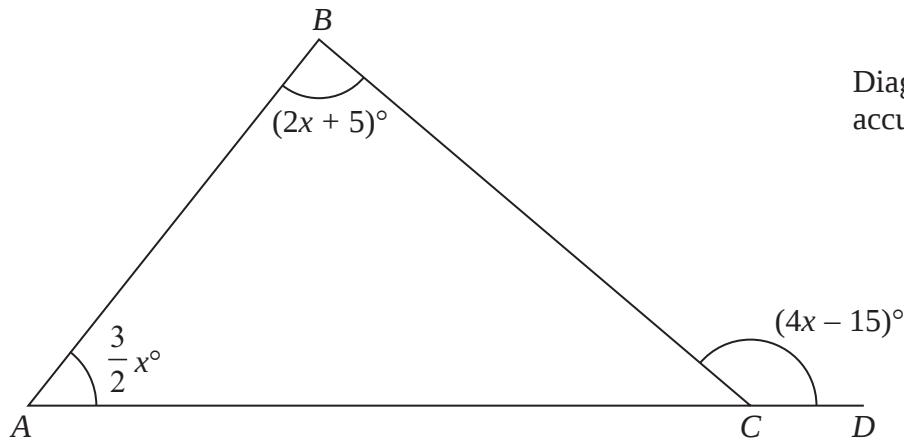


Diagram **NOT**
accurately drawn

ABC is a triangle and ACD is a straight line.

$\angle BAC = \frac{3}{2}x^\circ$, $\angle ABC = (2x + 5)^\circ$ and $\angle BCD = (4x - 15)^\circ$

Find the value of x .

$x = \dots\dots\dots$

(Total for Question 14 is 3 marks)



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15 Two non-zero vectors **a** and **b** are not parallel.

Given that $n\mathbf{a} + m\mathbf{b} = \mathbf{b} + 2m(\mathbf{a} - \mathbf{b})$, where m and n are scalars, find the value of m and the value of n .

$$m = \dots\dots\dots$$

$$n = \dots\dots\dots$$

(Total for Question 15 is 3 marks)

16 Find the largest integer, x , such that $\frac{1}{2}(2x + 1) > 3x - 5$

.....

(Total for Question 16 is 3 marks)



17 Given that $\sqrt{(x^2 + 9)} = x + y$

find x in terms of y

$x = \dots\dots\dots$

(Total for Question 17 is 4 marks)

18 Here are 8 numbers

5.9 6.3 6.7 6.9 7.5 8.1 8.1 8.9

(a) Find the median of the 8 numbers.

$\dots\dots\dots$
(2)

(b) Calculate the mean of the 8 numbers.

$\dots\dots\dots$
(2)

(Total for Question 18 is 4 marks)

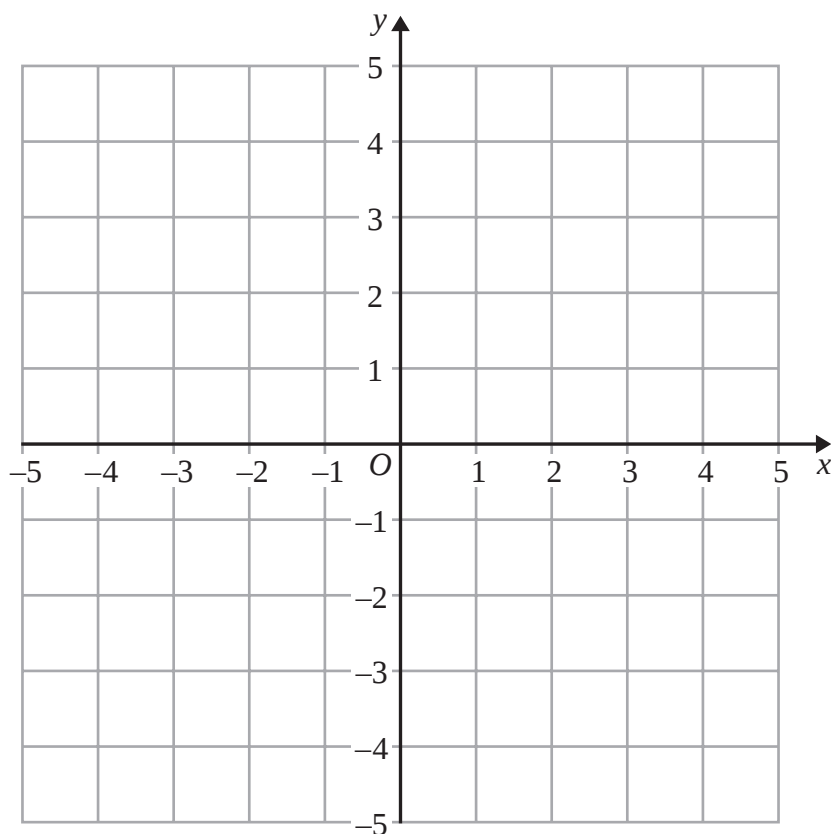
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19



(a) On the grid, draw and label

(i) the line with equation $y = -x$

(ii) the line with equation $y = x + 2$

(2)

$ABCDE$ is a pentagon. The pentagon has the line with equation $y = -x$ as its axis of symmetry.

The point A has coordinates $(3, 0)$, the point D has coordinates $(-4, 4)$ and the point E has coordinates $(1, 3)$.

(b) Find the coordinates of B and the coordinates of C .

B (.....,)

C (.....,)

(2)

(Total for Question 19 is 4 marks)

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20 y varies inversely as the cube of x

$$y = 256 \text{ when } x = \frac{1}{2}$$

Find the value of x when $y = \frac{4}{27}$

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

(Total for Question 20 is 4 marks)

21 The n th term of a sequence is given by $u_n = 2^n$ where $n = 1, 2, 3, 4, \dots$

(a) Write down the first four terms of this sequence.

.....
(2)

(b) Find the value of $\frac{u_{500}}{u_{488}}$ giving your answer as a power of 8

.....
(3)

(Total for Question 21 is 5 marks)

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- 22 A particle P is moving along a straight line. At time t seconds ($t \geq 0$), the displacement, s metres, of P from a fixed point O of the line is given by

$$s = \frac{5}{3}t^3 - \frac{9}{2}t^2 - 2t$$

At time t seconds, the velocity of P is v m/s.

- (a) Find an expression for v in terms of t .

$$v = \dots\dots\dots$$

(2)

- (b) Find the value of t when P is instantaneously at rest.

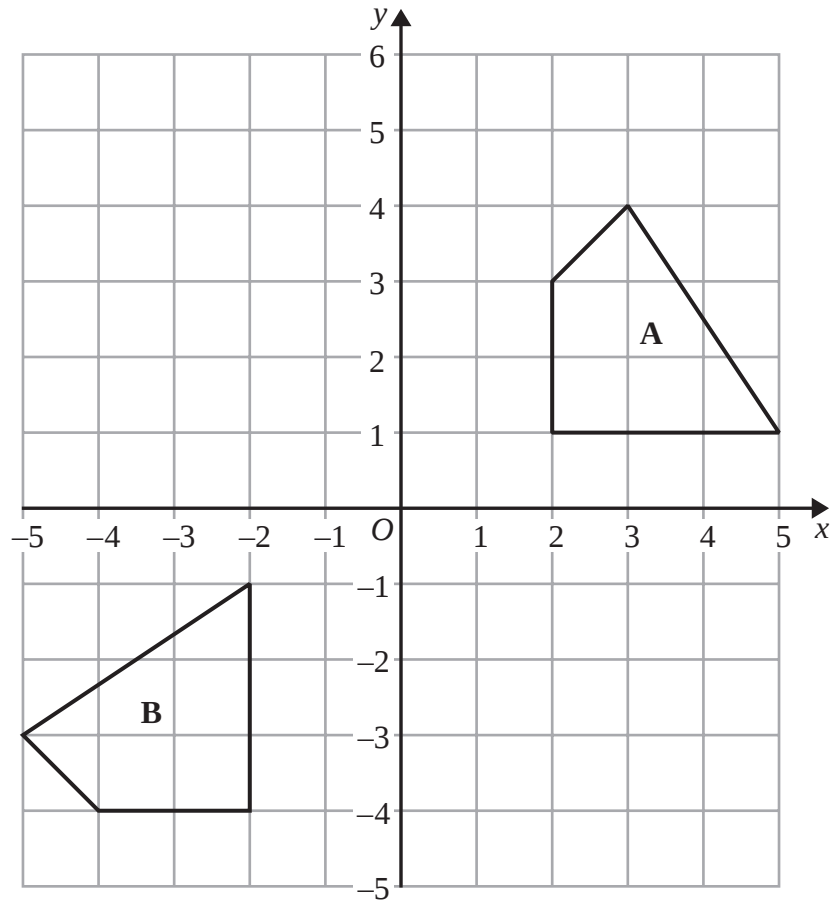
$$t = \dots\dots\dots$$

(3)

(Total for Question 22 is 5 marks)



23



Quadrilateral **A** is transformed to quadrilateral **B** by an anticlockwise rotation about the origin followed by a translation.

(a) Write down the angle of rotation.

(1)

(b) Find the 2×2 matrix which represents this rotation.

(2)

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(c) Find the column vector which represents the translation.

$\begin{pmatrix} \\ \end{pmatrix}$

(2)

(Total for Question 23 is 5 marks)

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24 Given that for all values of x ,

$$6x^3 - 19x^2 - 26x + 24 = (6x^2 + kx - 6)(x - 4) \quad \text{where } k \text{ is a constant,}$$

(a) show that $k = 5$

(2)

(b) Hence factorise completely $6x^3 - 19x^2 - 26x + 24$

(3)

(Total for Question 24 is 5 marks)

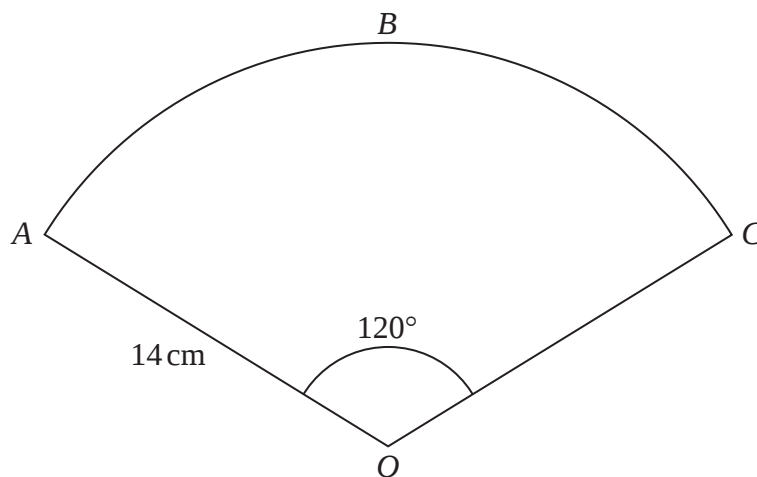
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25

Diagram **NOT**
accurately drawn

The diagram shows a piece of card in the shape of a sector, $OABC$, of a circle of radius 14 cm and centre O . The arc ABC subtends an angle of 120° at the centre of the circle.

- (a) Calculate the length, in cm to 3 significant figures, of the arc ABC .

..... cm
(2)

A hollow right circular cone is formed by joining OA and OC together.

Calculate, in cm to 3 significant figures,

- (b) the radius of the cone,

..... cm
(2)

- (c) the height of the cone.

..... cm
(2)

(Total for Question 25 is 6 marks)

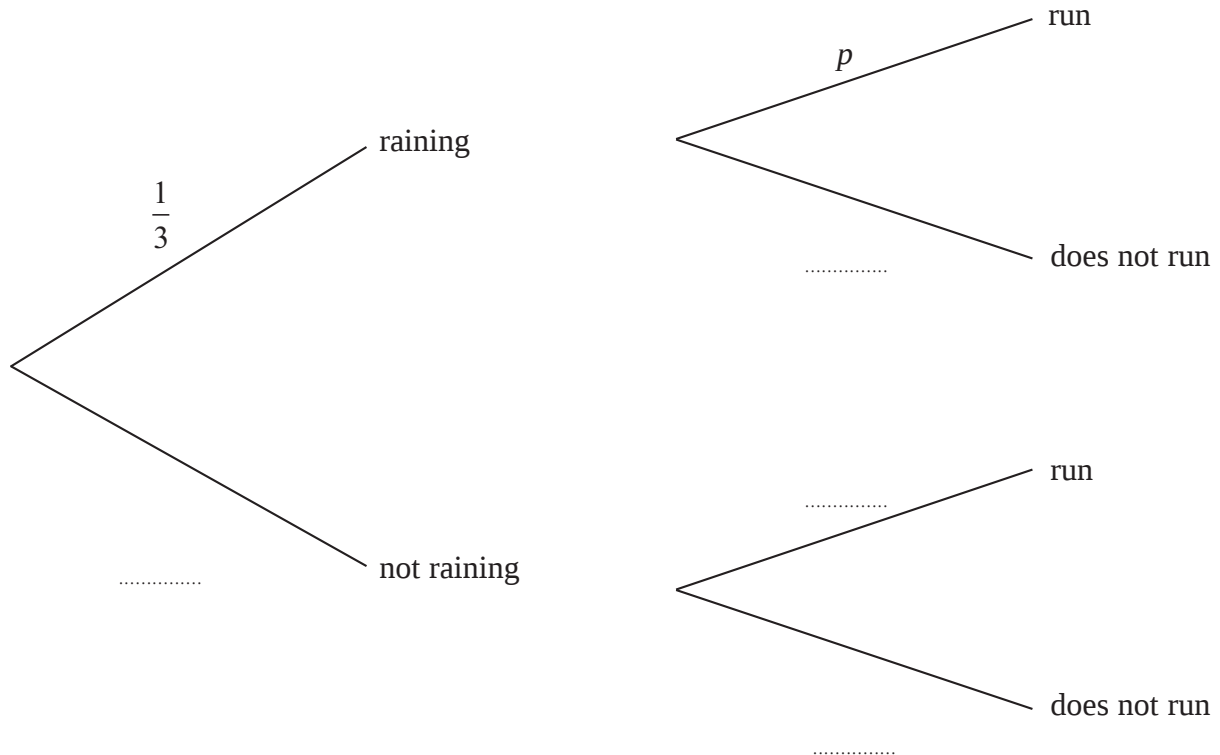


26 The probability that it rains on any morning in the town of *Lloviendo* is $\frac{1}{3}$

If it is raining on a morning, the probability that Maria goes for a run is p

If it is not raining on a morning, the probability that Maria goes for a run is $\frac{4}{5}$

(a) Complete the probability tree diagram.



(3)

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The probability that Maria goes for a run on any morning is $\frac{37}{60}$

(b) Using your tree diagram and this information, form an equation in p

.....
(2)

(c) Find the value of p

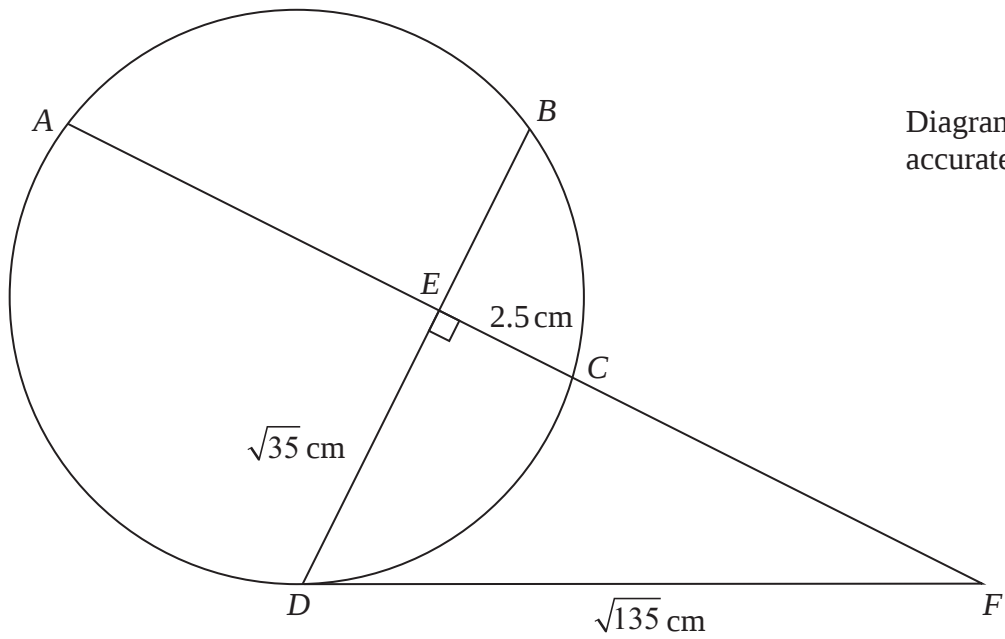
$p =$
(2)

(Total for Question 26 is 7 marks)

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27



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$ABCD$ is a circle. The chords AC and DB intersect at right angles at the point E . The point F is such that $AECF$ is a straight line and FD is the tangent to the circle at D .

$EC = 2.5$ cm, $DE = \sqrt{35}$ cm and $DF = \sqrt{135}$ cm.

(a) Calculate the length, in cm, of EF .

..... cm
(2)

(b) Show that $AE = 8$ cm.

(3)

(c) Calculate the length, in cm to 3 significant figures, of EB .

..... cm

(2)

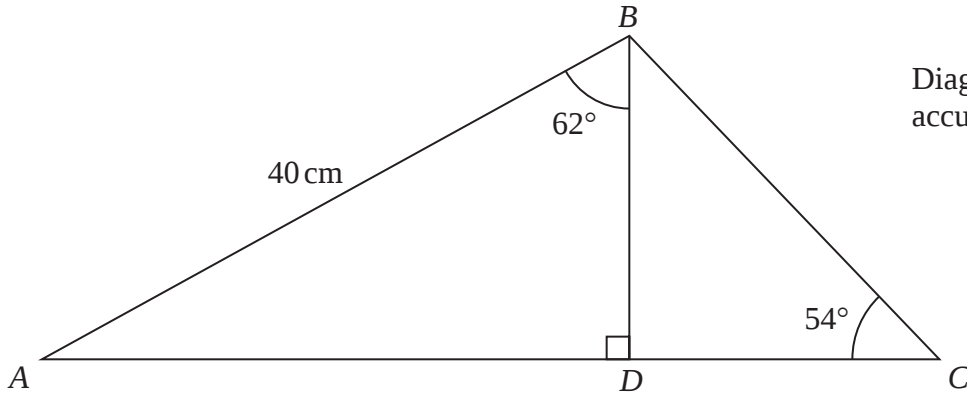
(Total for Question 27 is 7 marks)

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Turn over for Question 28



28

Diagram **NOT**
accurately drawn

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 ABC is a triangle. D is the point on AC such that BD is perpendicular to AC . $AB = 40$ cm, $\angle ABD = 62^\circ$ and $\angle BCD = 54^\circ$ Calculate the area, in cm^2 , of triangle ABC . Give your answer to 3 significant figures...... cm^2

(Total for Question 28 is 6 marks)

TOTAL FOR PAPER IS 100 MARKS