Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

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General Certificate of Secondary Education
November 2004

ASSESSMENT and QUALIFICATIONS ALLIANCE

MATHEMATICS (MODULAR) (SPECIFICATION B) 33005/I2
Module 5 Intermediate Tier
Paper 2 Calculator

Tuesday 9 November 2004 9.00 am to 10.15 am

In addition to this paper you will require:
- a calculator
- mathematical instruments.

Time allowed: 1 hour 15 minutes

Instructions
- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this booklet.
- If your calculator does not have a π button, take the value of π to be 3.14 unless otherwise instructed in the question.

Information
- The maximum mark for this paper is 70.
- Mark allocations are shown in brackets.
- Additional answer paper, graph paper and tracing paper will be issued on request and must be tagged securely to this answer booklet.
- You are expected to use a calculator where appropriate.

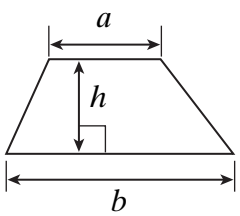
Advice
- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Pages	Mark
3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
14 – 15	
16	
TOTAL	
Examiner's Initials	

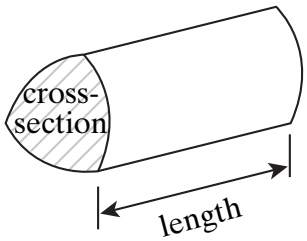
Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

Area of trapezium = $\frac{1}{2}(a+b)h$



Volume of prism = area of cross-section × length



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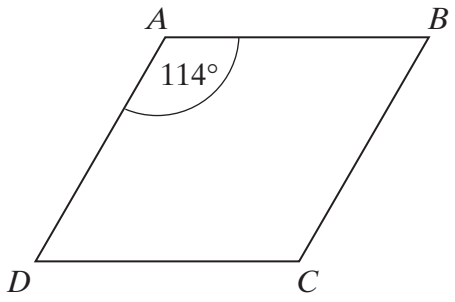
Answer **all** questions in the spaces provided.

1 *ABCD* is a rhombus.
Angle $A = 114°$



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(a) Find the size of angle *C*.

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Answer ..... degrees *(1 mark)*

(b) Find the size of angle *D*.

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Answer ..... degrees *(2 marks)*

2 (a) Work out the cube of 17.

Answer ..... *(1 mark)*

(b) Work out $\frac{1}{3.2} + 2.6^2$

Answer ..... *(1 mark)*

5

Turn over ▶

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3 The nth term of a sequence is $3n - 1$

(a) Write down the first and second terms of the sequence.

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Answer First term .....

Second term .....

(2 marks)

(b) Which term of the sequence is equal to 32?

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Answer ..... *(1 mark)*

(c) Explain why 85 is not a term in this sequence.

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(2 marks)

4 Dilip has a space in his living room which is $2\frac{1}{2}$ feet wide.
He has a bookcase which is 80 cm wide.

Will the bookcase fit into the space?
You **must** show your working.

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(3 marks)

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5 Jan cycles at 10 mph.

Convert this speed to km/h.

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Answer ..... km/h *(2 marks)*

6 Grace is x years old.

Harry is 3 years older than Grace.

(a) Write down an expression for Harry's age.

Answer ..... *(1 mark)*

(b) Jack is twice as old as Harry.

Write down an expression for Jack's age.

Answer ..... *(1 mark)*

TURN OVER FOR THE NEXT QUESTION

12

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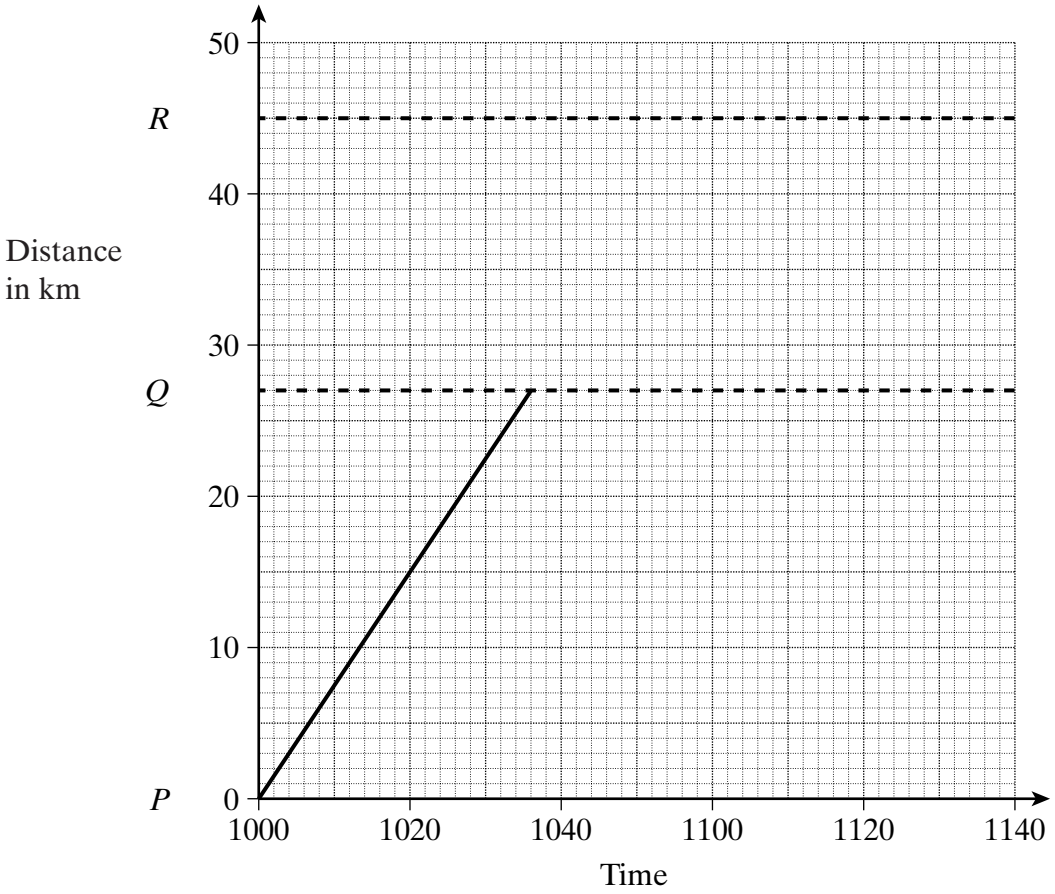
7 Mrs Murphy drives from Pyeton (P) to Queenswell (Q).
The graph shows her journey.



(a) How far is it from Pyeton to Queenswell?

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Answer ..... km *(1 mark)*

(b) At what time does she arrive at Queenswell?

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Answer ..... *(1 mark)*

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(c) Mrs Murphy stays at Queenswell for 20 minutes.
Then she drives on to Rokeby (R) at the same speed as before.

(i) Show the rest of her journey on the grid.

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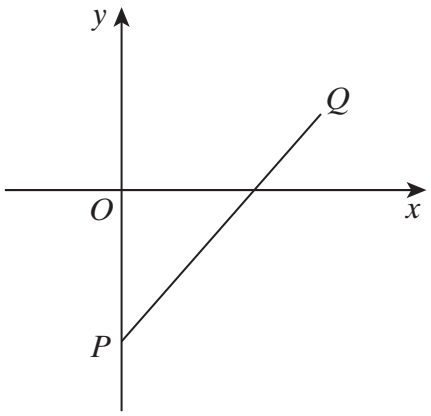
(3 marks)

(ii) At what time does she arrive at Rokeby?

Answer ..... *(1 mark)*

8 The diagram shows the points $P(0,-4)$ and $Q(5,2)$.



Find the coordinates of the mid-point of the line segment PQ.

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Answer (..... , ...) *(2 marks)*

8

Turn over ▶

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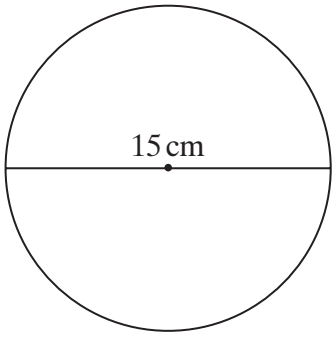
9 The diameter of a circle is 15 cm.

Calculate the circumference of the circle.



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Answer ..... cm *(2 marks)*

10 (a) Simplify $3d - 5e + 4d + e$

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Answer ..... *(2 marks)*

(b) Multiply out $4(3x + 7)$

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Answer ..... *(1 mark)*

(c) Solve $4(3x + 7) = 28$

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Answer $x =$ ..... *(2 marks)*

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11 Kate and Lee are working out this question.

A solution of the equation $x^3 + x = 700$ lies between 8 and 9. Use trial and improvement to find this solution, correct to one decimal place.

Kate's answer is 8.8
Lee's answer is 8.9

Which answer is correct?
You **must** show all your working.

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Answer $x =$ ..... *(3 marks)*

TURN OVER FOR THE NEXT QUESTION

10

Turn over ▶

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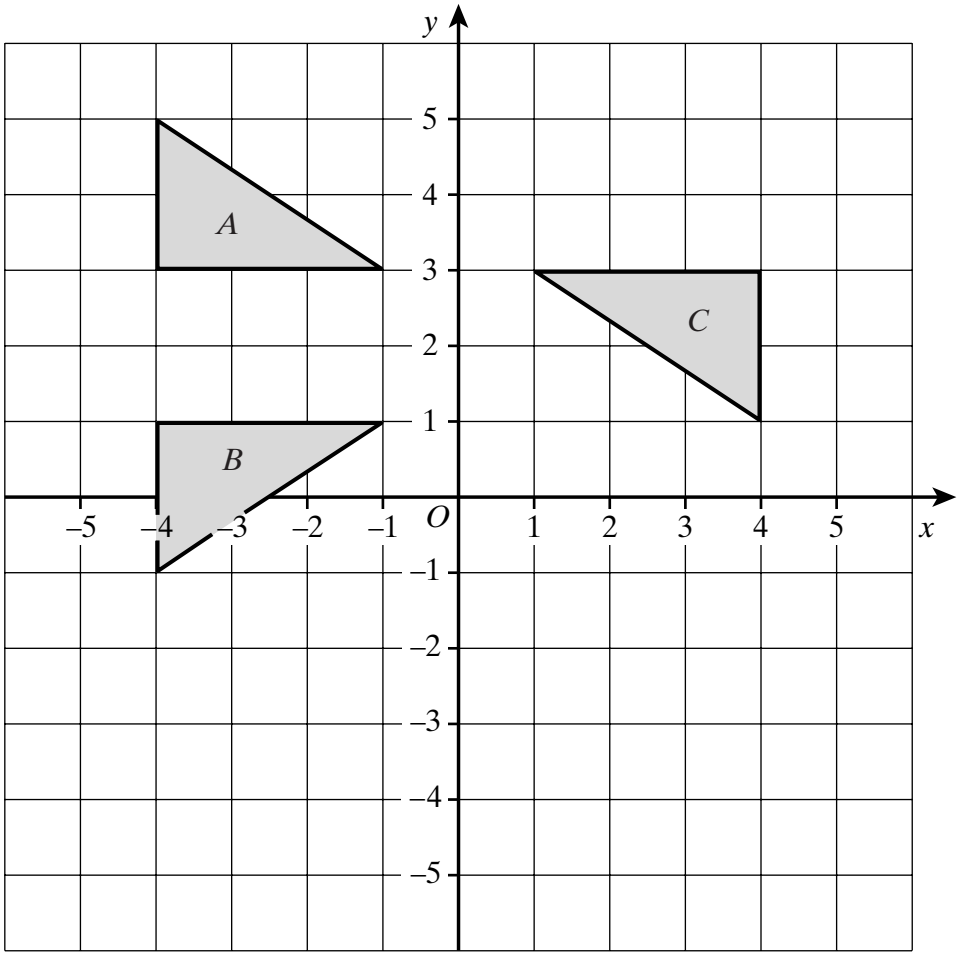
12



(a) Describe fully the **single** transformation which takes triangle *A* onto triangle *B*.

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(2 marks)

(b) Triangle *A* is rotated onto triangle *C*.

(i) Write down the angle of rotation.

Answer ..... degrees *(1 mark)*

(ii) Write down the coordinates of the centre of rotation.

Answer (..... , ...) *(1 mark)*

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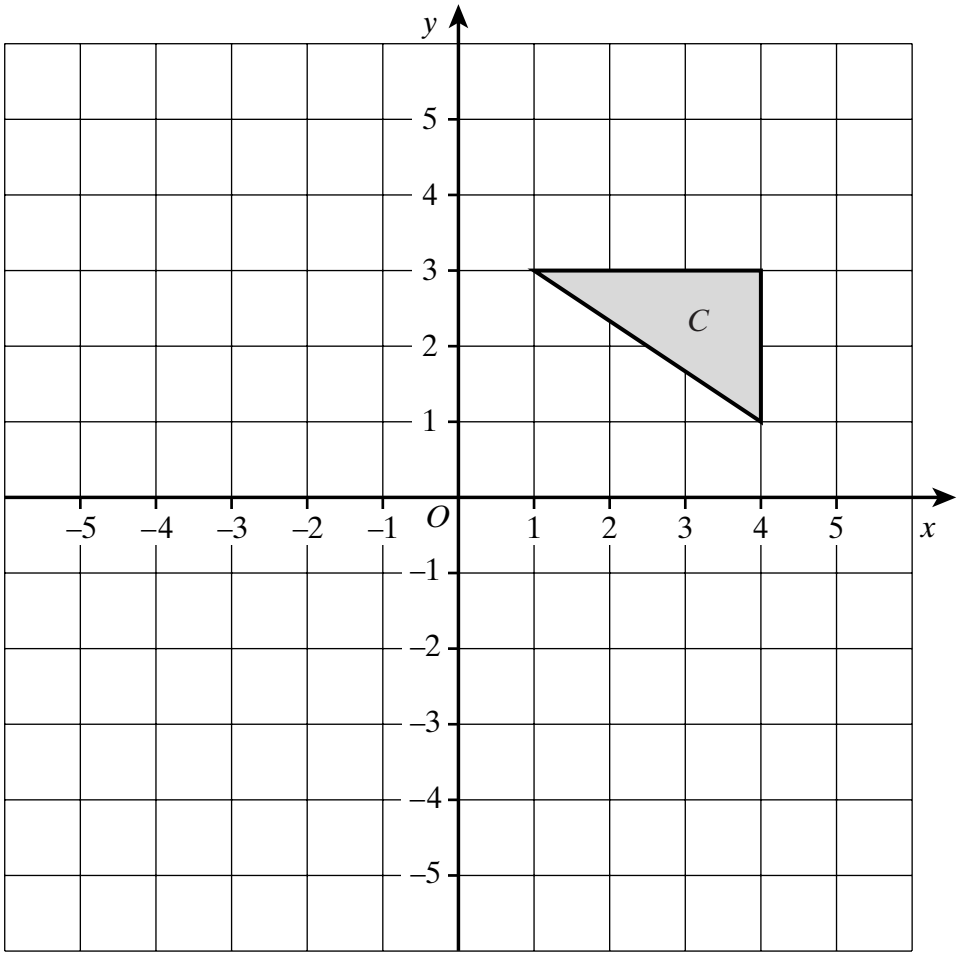
(c)



Triangle C is translated by the vector $\begin{pmatrix} 1 \\ -4 \end{pmatrix}$

Draw the new position of triangle C.

(2 marks)

TURN OVER FOR THE NEXT QUESTION

6

Turn over ▶

LEAVE MARGIN BLANK

13 (a) List the integer values of x such that $5 \leqslant 3x < 18$

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Answer ..... *(3 marks)*

(b) Solve the equation $\frac{20}{y} = 4$

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Answer $y =$ ..... *(2 marks)*

(c) Solve the equation $z^2 - 9z + 8 = 0$

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Answer ..... *(3 marks)*

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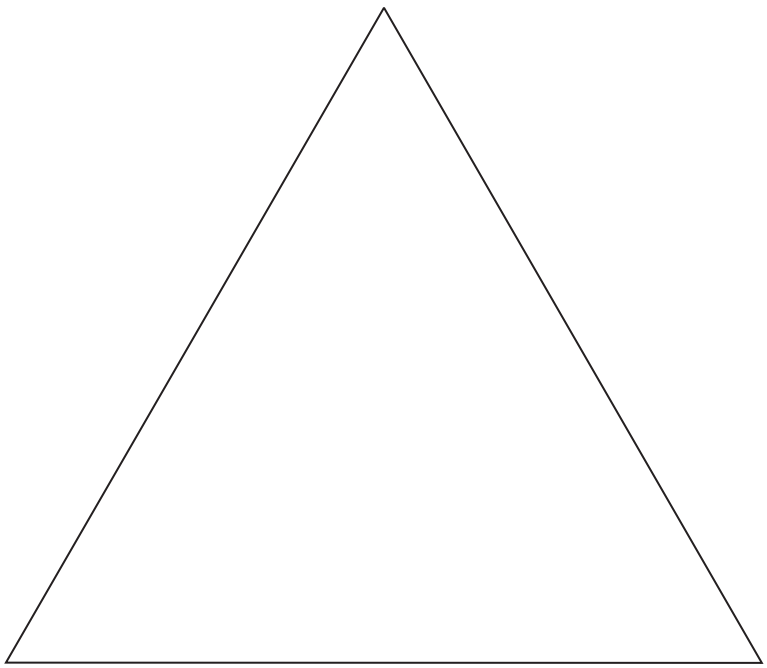
14 In this question, you should use a ruler and compasses.

The diagram shows an equilateral triangle of side 10 cm.



Show on the diagram all the points inside the triangle that are more than 5 cm from each vertex of the triangle.

You **must** show clearly all your construction arcs.

(3 marks)

11

Turn over ▶

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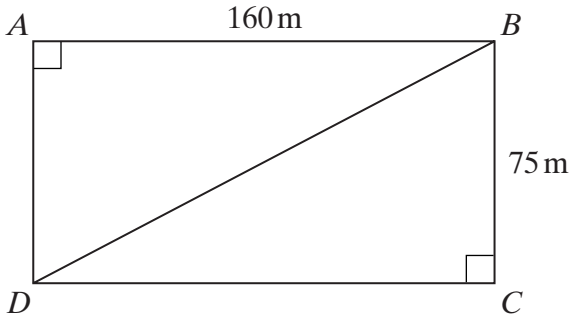
15 A rectangular field $ABCD$ is shown.
The length of the field, $AB = 160\,\text{m}$.
The width of the field, $BC = 75\,\text{m}$.



Not to scale

Calculate the length of the diagonal BD.

Give your answer to a suitable degree of accuracy.

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Answer ..... m *(4 marks)*

16 Make c the subject of the formula $E = mc^2$

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Answer $c =$ ..... *(2 marks)*

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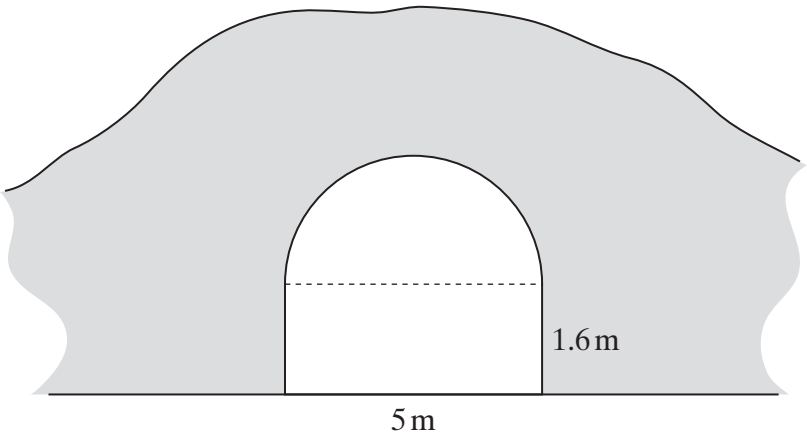
17 The sketch shows the entrance to a tunnel.
The uniform cross-section of the tunnel is in the shape of a semi-circle over a rectangle.



Not to scale

The rectangle is 5 metres wide and 1.6 metres high.
The tunnel is 230 metres long.

Calculate the volume of earth removed in digging the tunnel.

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Answer ..... m^3 *(5 marks)*

TURN OVER FOR THE NEXT QUESTION

11

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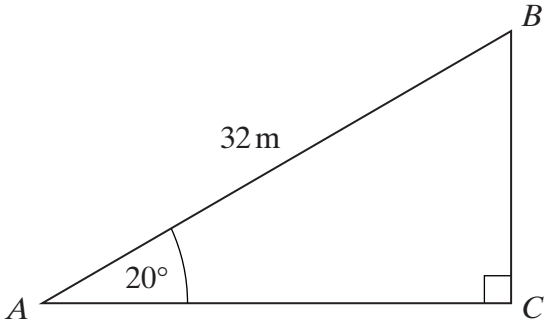
18 The diagram shows a triangle ABC.
Angle $A = 20°$ and angle $C = 90°$
$AB = 32\,\text{m}$



Not drawn accurately

Calculate the height BC.

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Answer ..... m *(3 marks)*

19 Solve the equation $\dfrac{x+5}{3} + \dfrac{2x-1}{4} = 1$

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Answer $x =$ ..... *(4 marks)*

END OF QUESTIONS

7

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