Surname	Centre Number	Candidate Number
First name(s)		0

GCSE

3300U40-1

A19-3300U40-1

WEDNESDAY, 13 NOVEMBER 2019 – MORNING

MATHEMATICS
UNIT 2: CALCULATOR-ALLOWED
INTERMEDIATE TIER

1 hour 45 minutes

ADDITIONAL MATERIALS

A calculator will be required for this examination.

A ruler, protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

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

If you run out of space, use the additional page at the back of the booklet. Question numbers must be given for all work written on the additional page.

Take π as 3·14 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

In question **5**, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**6**	
2.	**3**	
3.	**3**	
4.	**3**	
5.	**7**	
6.	**5**	
7.	**4**	
8.	**6**	
9.	**3**	
10.	**4**	
11.	**7**	
12.	**6**	
13.	**3**	
14.	**3**	
15.	**4**	
16.	**6**	
17.	**1**	
18.	**6**	
Total	**80**	

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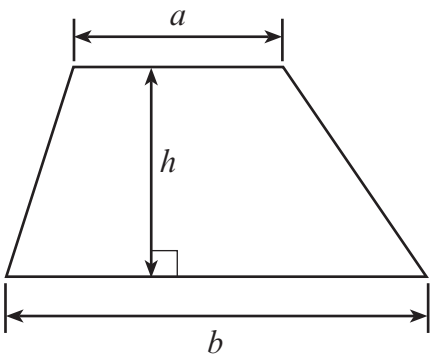
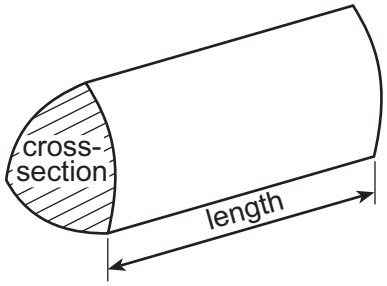
Formula List – Intermediate Tier

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



Volume of prism = area of cross-section × length



Examiner only

1. *(a)* Calculate $12\frac{1}{2}\%$ of 1176. [2]

(b) What is the square root of 36 760?
Give your answer correct to 2 significant figures. [2]

(c) Evaluate $\frac{4{\cdot}3 \times 8{\cdot}6}{9{\cdot}3 - 1{\cdot}4}$.
Give your answer correct to 1 decimal place. [2]

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2.

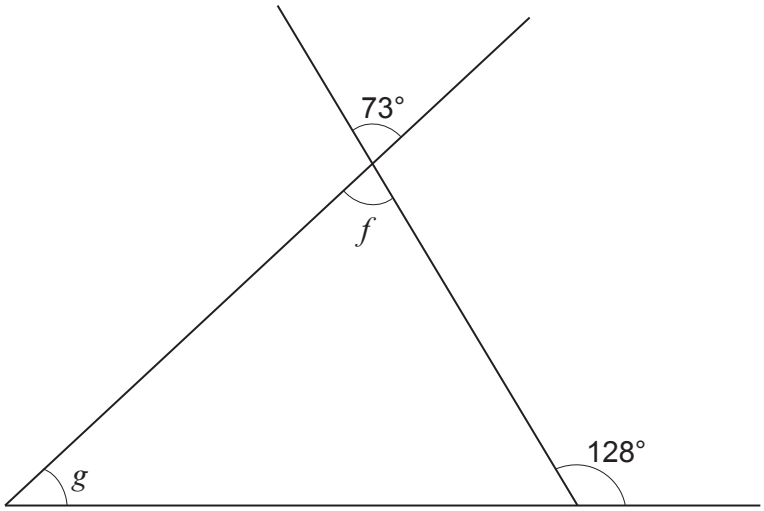

Diagram not drawn to scale

Calculate the size of each of the angles f and g. [3]

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f = ... ° g = ... °

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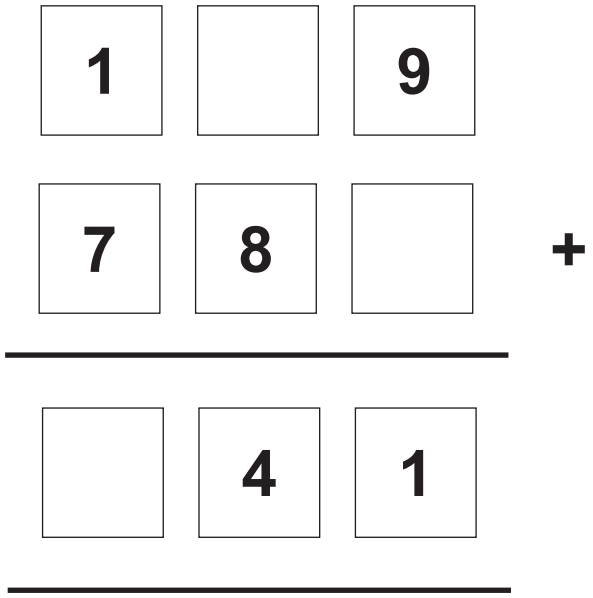
3. Fill in the boxes so that the following addition is correct. [3]



Space for working:

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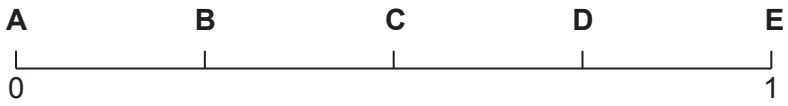
4. *(a)* A person is chosen at random.
Which is the best estimate for the probability that this person was born in the month of March?
Circle the correct answer. [1]

$\frac{1}{30}$ $\frac{1}{31}$ $\frac{12}{365}$ $\frac{1}{12}$ $\frac{12}{31}$

(b) A box contains four coloured cards.
One card is blue, one is red, one is green and one is white.
A card is drawn from the box at random.

Which letter, **A**, **B**, **C**, **D** or **E**, represents the probability that the card drawn is **not** blue?
Circle the correct letter on the probability scale below. [1]



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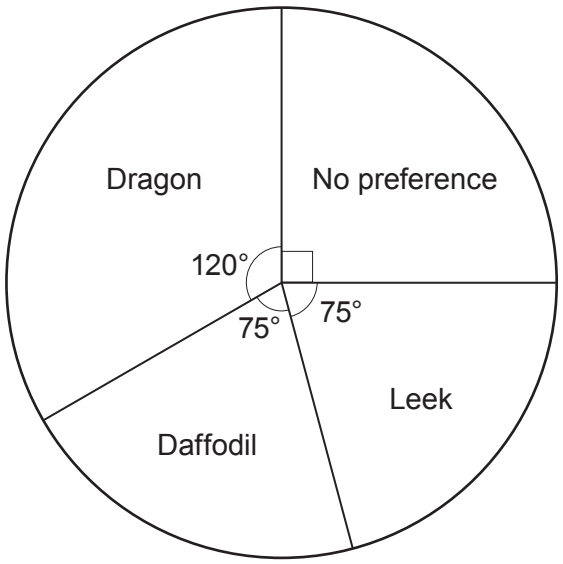
(c) The pupils at a school were asked the following question.

'What design would you like to have on the school's badge?'

Dragon ☐ Daffodil ☐ Leek ☐ No preference ☐

The results of the replies received are shown in the pie chart below.



A pupil who answered the question is chosen at random.
What is the probability that this pupil wanted the design to be a dragon?
Circle the correct answer. [1]

$\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{360}$ 4% $\frac{1}{120}$

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Examiner only

5. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

A task takes 6 hours 15 minutes to complete.

$\frac{2}{5}$ of this time is spent on planning.

How long was spent on the **rest of the task**?
Give your answer in hours and minutes.

You must show all your working. [5 + 2 OCW]

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6. A coach company runs trips to Llandudno and Aberystwyth.
The information kept by the company about the passengers on these trips includes:

- the destination of the trip,
- their ages.

The table below shows the number of passengers who went to Llandudno or Aberystwyth last Tuesday.

	Llandudno	Aberystwyth
Passengers 60 years old and over	323	217
Passengers under 60 years old	122	58

(a) What was the ratio of passengers 60 years old and over to passengers under 60 years old?
Give your answer in its simplest form. [3]

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Passengers 60 years old and over : passengers under 60 years old

= ..... : .....

(b) One of these passengers was selected at random.
What is the probability that this passenger went on the trip to Llandudno? [2]

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Examiner only

7. *A* and *B* are two points **300 metres** apart.

P is a point such that $A\hat{B}P$ = 115° and *BP* = 400 metres.

The line *AB* shown below is part of an **accurate scale drawing** to show the positions of points *A*, *B* and *P*.

Complete the scale drawing to show the **two** possible positions of *P*. [4]

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Examiner only

8. *(a)* Solve the following equations.

(i) $\frac{x}{9} = 4$ [1]

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(ii) $4(3x + 2) = 12$ [3]

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(b) Factorise each of the following.

(i) $14a + 21$ [1]

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(ii) $f^2 - f$ [1]

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Turn over.

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9.

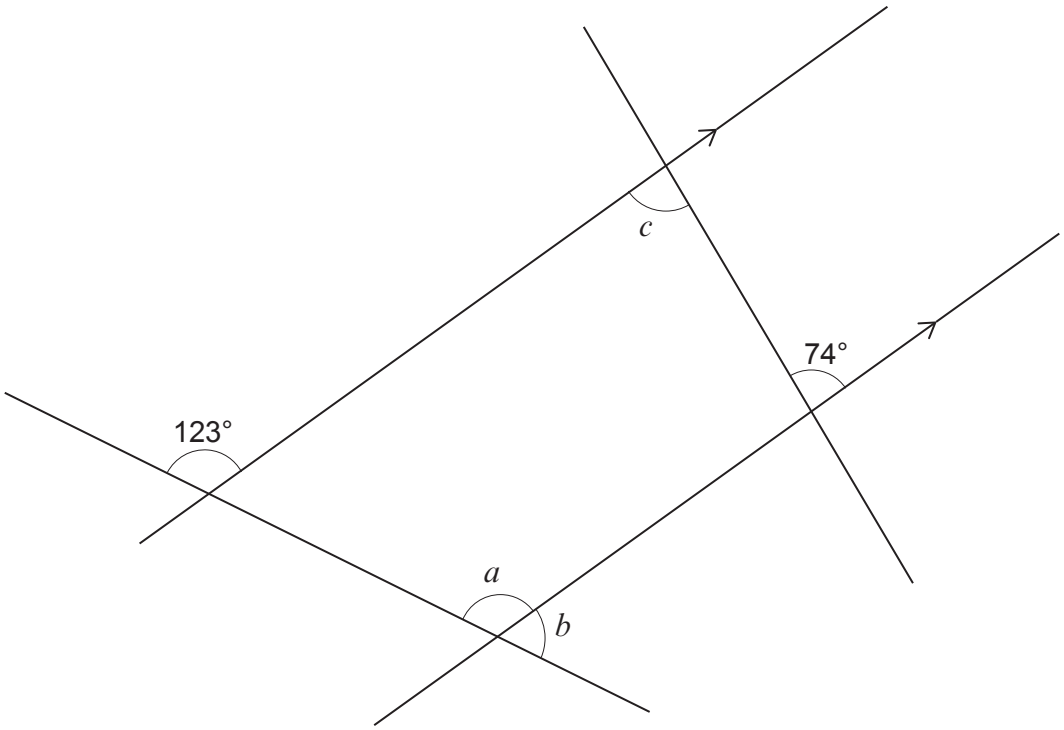

Diagram not drawn to scale

Find the size of each of the angles a, b and c. [3]

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a = ... ° b = ... ° c = ... °

Examiner only

10. A solution of the equation

$$x^3 - 3x = 37$$

lies between 3 and 4.

Use the method of trial and improvement to find this solution correct to 1 decimal place. You must show all your working. [4]

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11. *(a)* A biased coin is thrown 100 times.
The number of heads thrown is recorded after 20 throws, 40 throws, 60 throws, 80 throws and 100 throws.

Some of the results are recorded in the relative frequency table below.

Complete the table. [2]

Number of throws	20	40	60	80	100
Number of heads	11	18	24	30	
Relative frequency	0·55	0·45		0·375	0·37

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Examiner only

(b)

5 7 8 11 14 17 17 19 26 28

The sum of the ten numbers shown above is 152.
The numbers are displayed in the grouped frequency table shown below.

Number	0 - 9	10 - 19	20 - 29
Frequency	3	5	2

Consider the estimated mean calculated from the table and the actual mean of the ten numbers.
Calculate the difference between these two values.
You must show all your working. [5]

Examiner only

12. The table below shows some of the values of $y = x^2 - 2x - 4$ for values of x from –3 to 4.

x	−3	−2	−1	0	1	2	3	4
$y = x^2 - 2x - 4$	11	4	−1	−4		−4	–1	4

(a) Complete the table by finding the value of y when x = 1. [1]

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(b) On the graph paper opposite, draw the graph of $y = x^2 - 2x - 4$ for values of x from –3 to 4. [2]

(c) (i) Draw the line $y + x = 4$ on the graph paper. [2]

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(ii) Write down the values of x where the line $y + x = 4$ cuts the curve $y = x^2 - 2x - 4$. [1]

Values of x are ..... and .....

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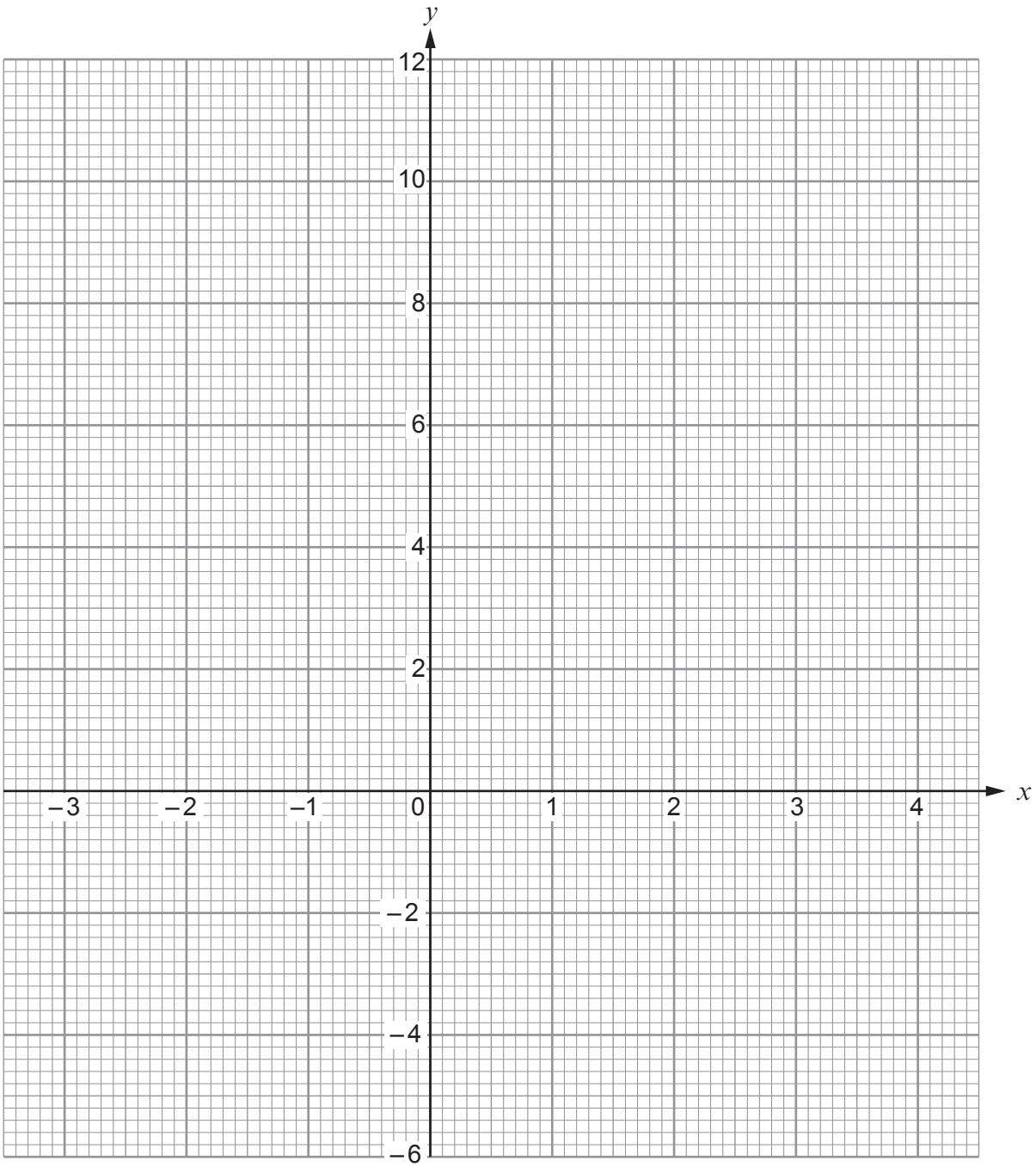

Examiner only

13. Sian thinks of a number.
Its value is increased by 25%.

Express the original number as a percentage of the increased number. [3]

14. Calculate the length of the side *MN* in the triangle *LMN* shown below. [3]

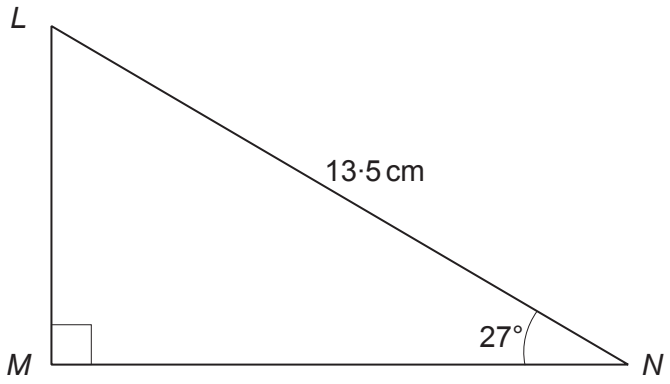

Diagram not drawn to scale

Examiner only

15. Solve the following simultaneous equations using an algebraic (not graphical) method.

$$5x + 3y = 11$$
$$2x - 7y = 29$$

You must show all your working. [4]

Examiner only

16. A solid object is made by drilling a cylindrical hole of radius 4 cm through a cuboid measuring 20 cm by 15 cm by 10 cm as shown below.

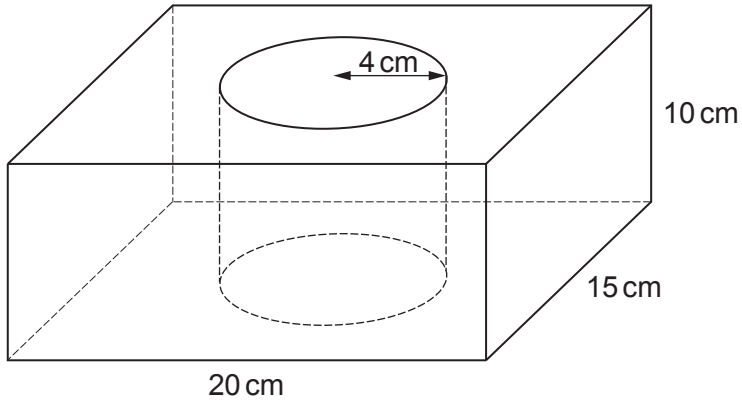

Diagram not drawn to scale

(a) Calculate the volume of the object.
Give your answer in cm^3. [3]

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Volume = ... cm^3

Examiner only

(b) The object is made from a material which has a density of 2·4 g/cm^3.
Calculate the mass of the object.
Give your answer in kg, correct to the nearest kg. [3]

Mass = ... kg

17. The equation of a straight line is $y = 8x - 5$.
What is the gradient of the line?

Circle the correct answer. [1]

$\frac{1}{8}$ –5 8 5 1

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18. The right-angled triangle *ABC* has an area of 84 cm^2.
AB = 24 cm.

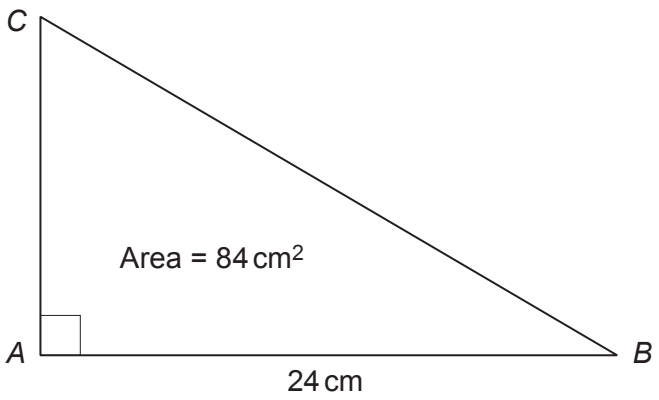

Diagram not drawn to scale

Calculate the perimeter of the triangle *ABC*.
You must show all your working. [6]

END OF PAPER

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

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