Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

8598736066

MATHEMATICS **0580/33**

Paper 3 (Core) **May/June 2020**

2 hours

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 104.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages. Blank pages are indicated.

DC (LK/CB) 186455/2

[Turn over

1 **(a)** **(i)** Write down a fraction equivalent to $\frac{1}{15}$.

..... [1]

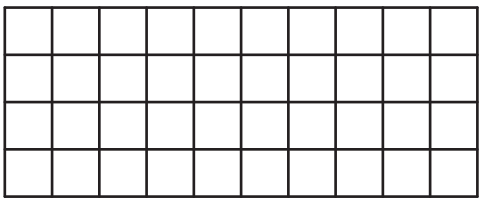
(ii) Find a fraction that is greater than $\frac{1}{15}$ but less than $\frac{2}{15}$.

..... [1]

(b) **(i)** Write 15% as a decimal.

..... [1]

(ii) Shade 15% of this grid.



[1]

(c) Write down all the factors of 15.

..... [2]

(d) Find the value of $\sqrt{15}$.
Give your answer correct to 3 decimal places.

..... [2]

(e) **(i)** Write down the reciprocal of 15.

..... [1]

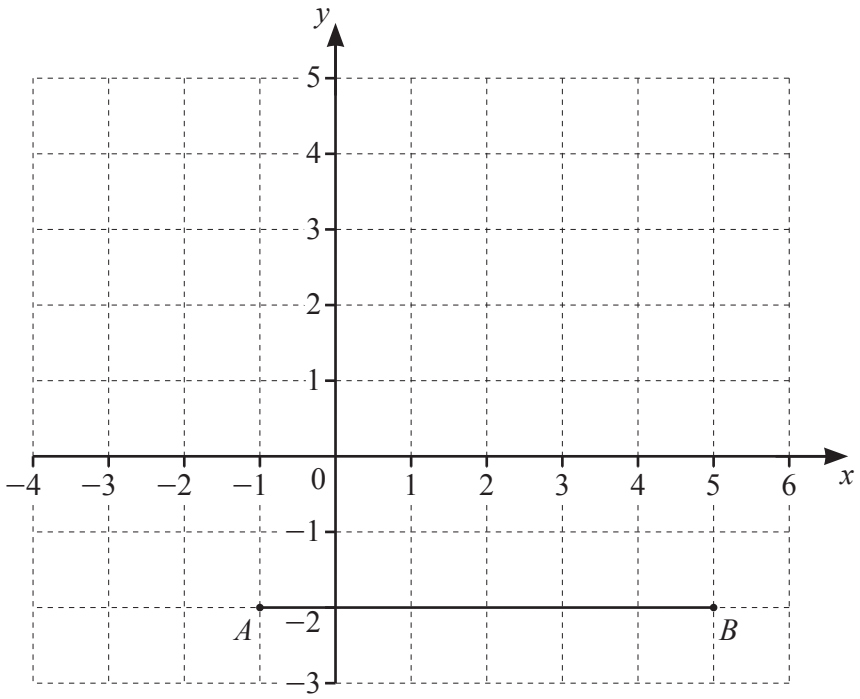
(ii) Write down the value of 15^0.

..... [1]

(iii) Write 0.015 in standard form.

..... [1]

2 The diagram shows a line AB on a $1\,\text{cm}^2$ grid.



(a) Write down the coordinates of point A.

(..... , ...) [1]

(b) Write down the vector $\overrightarrow{AB}$.

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(c) $\overrightarrow{BC} = \begin{pmatrix} -2 \\ 5 \end{pmatrix}$

Mark point C on the grid. [1]

(d) (i) Work out $\overrightarrow{AB} + \overrightarrow{BC}$.

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(ii) Complete this statement.

$\overrightarrow{AB} + \overrightarrow{BC} =$ ..... [1]

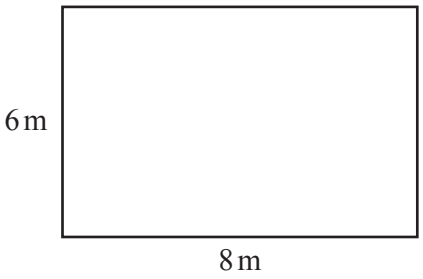
(e) A, B and C are three vertices of a parallelogram, $ABCD$.

(i) Mark point D on the diagram and draw the parallelogram $ABCD$. [1]

(ii) Work out the area of the parallelogram.
Give the units of your answer.

.... [2]

3 (a)



NOT TO SCALE

The diagram shows a rectangular patio with sides 6 m and 8 m.

(i) Work out the perimeter of the patio.

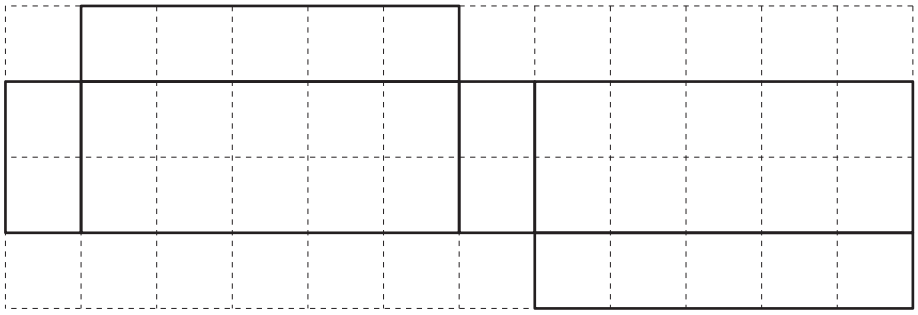
..... m [1]

(ii) Henri covers the patio floor with square tiles.
The tiles are 0.5 m by 0.5 m.

Work out the number of tiles he needs.

..... [2]

(b) The diagram shows the net of a solid on a 1 cm^2 grid.



(i) Write down the mathematical name for the solid.

..... [1]

(ii) Work out the volume of the solid.

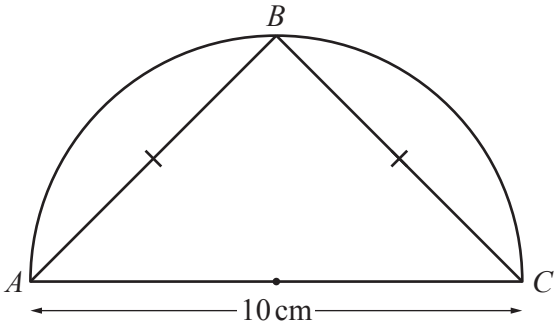
..... cm^3 [2]

(c) A square has perimeter $12x$.

Find an expression, in terms of x, for the area of the square.
Give your answer in its simplest form.

..... [3]

(d)



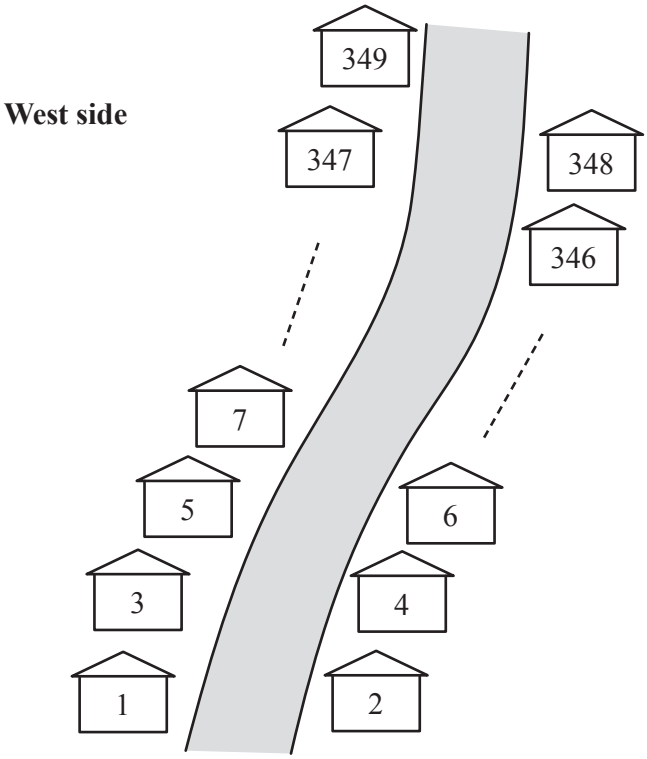
NOT TO SCALE

The diagram shows a semicircle with diameter AC.
B is a point on the circumference and $AB = BC$.

Work out the area of triangle ABC.

..... cm^2 [3]

4



A road has 349 houses on it numbered from 1 to 349.
The diagram shows some of these houses.
The houses on the West side of the road have odd numbers.
The houses on the East side have even numbers.

(a) Put a ring around the numbers in this list that are on the West side.

25 87 126 178 252 329

[1]

(b) On the East side, how many houses are there **between** the house numbered 168 and the house numbered 184?

..... [1]

(c) How many houses on the road have a house number that is a multiple of 39?

..... [2]

(d) Tomaz delivers a leaflet to every house on the West side of the road.
He starts at house number 1 and then delivers to each house in order.

(i) Find an expression, in terms of n, for the house number of the nth house he delivers to.

..... [2]

(ii) Work out the house number of the 40th house he delivers to.

..... [1]

(iii) Work out how many houses are on the West side of the road.

..... [2]

(e) Alicia delivers a leaflet to every house on the East side of the road.
She starts at house number 348 and then delivers to each house in order.

(i) Find an expression, in terms of n, for the house number of the nth house she delivers to.

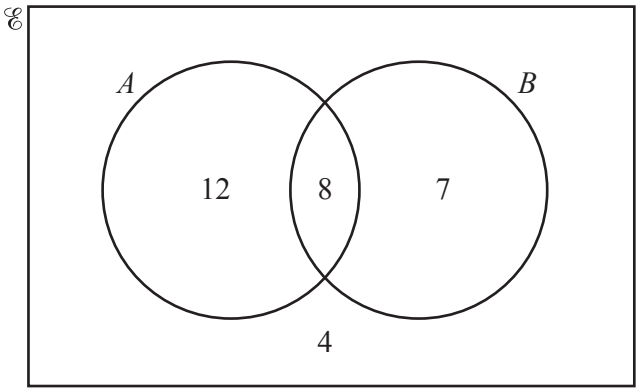
..... [2]

(ii) What is the largest value of n that can be used in your expression?
Give a reason for your answer.

The largest value of n is ..... because .....

..... [2]

5 **(a)** The Venn diagram shows information about the number of students in a class who like apples (A) and bananas (B).



(i) Work out the number of students in the class.

..... [1]

(ii) Work out the number of students who like bananas.

..... [1]

(iii) Work out $\mathrm{n}(A \cup B)$.

..... [1]

(iv) How many more students like apples than like bananas?

..... [1]

(v) One of the students is chosen at random.

Find the probability that this student does not like apples and does not like bananas.

..... [1]

(b) The mass, m grams, of a banana is 115 g, correct to the nearest 5 g.

Complete the statement about the value of m.

..... $\leqslant m <$ ..... [2]

(c) Six of the students bring an apple to school one day.
The list shows the mass of each apple, correct to the nearest gram.

82 94 78 103 88 82

(i) Find

(a) the mode,

..... g [1]

(b) the range,

..... g [1]

(c) the median.

..... g [2]

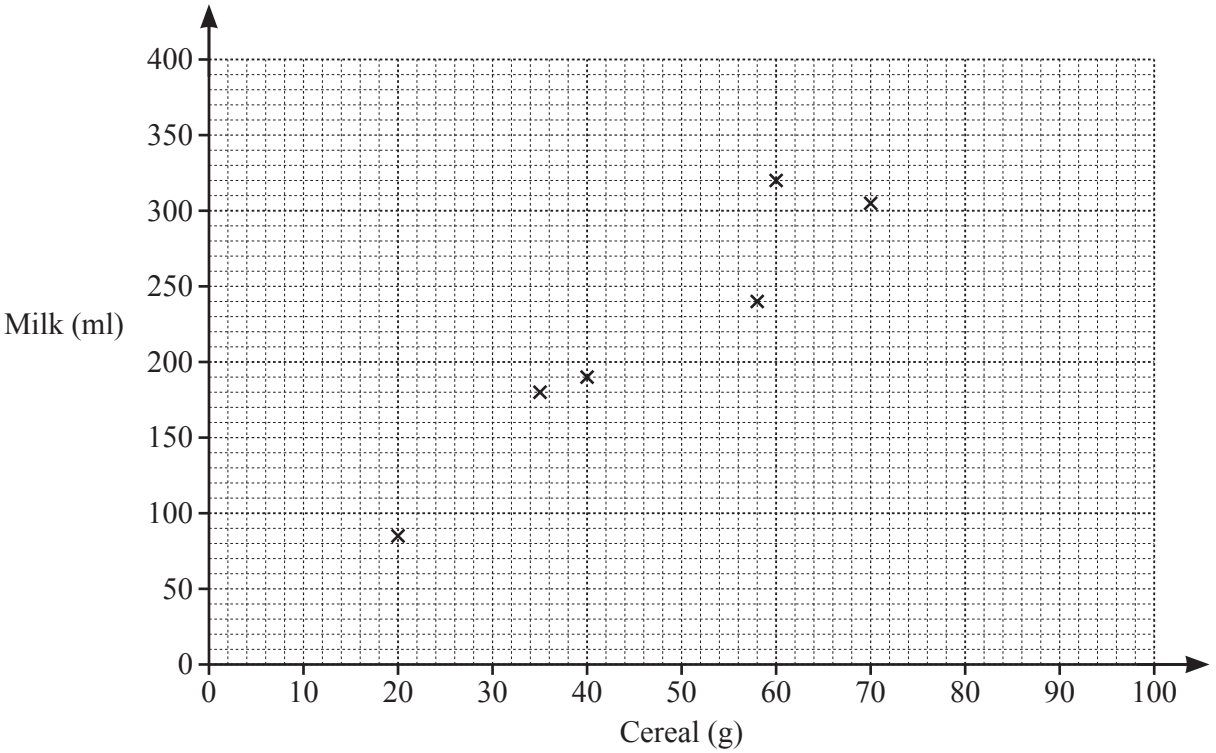
(ii) Another student, Toni, also brings an apple to school.
The mean mass of the 7 apples is 89 g.

Work out the mass of Toni's apple.

..... g [3]

6 **(a)** Ten students eat cereal with milk for breakfast.
The amounts are shown in the table.

Cereal (g)	40	20	58	70	60	35	28	40	55	46
Milk (ml)	190	85	240	305	320	180	150	230	340	220



(i) Complete the scatter diagram.
The first six points have been plotted for you. [2]

(ii) For these students, describe the relationship between the amount of cereal and the amount of milk.

..... [1]

(iii) On the grid, draw a line of best fit. [1]

(iv) Another student has 280 ml of milk with her cereal.

Use your line of best fit to estimate an amount of cereal this student has.

..... g [1]

(v) Explain why this scatter diagram should not be used to estimate the amount of milk for a student who has more than 70 g of cereal.

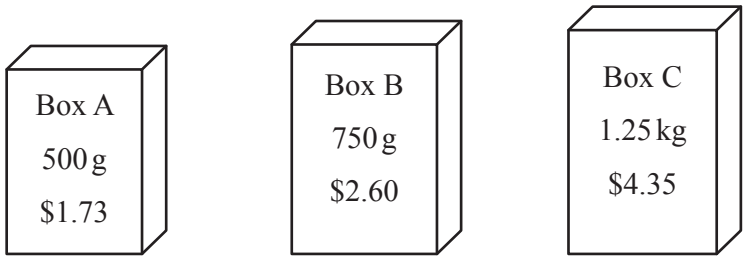
..... [1]

(b) 100 g of cereal contains 360 kilocalories.
100 ml of milk contains 45 kilocalories.
For breakfast Sasha has 35 g of cereal with 180 ml of milk.

Work out the number of kilocalories Sasha has for breakfast.

..... kcal [3]

(c) A shop sells cereal in boxes A, B and C.

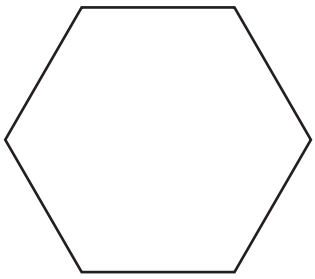


NOT TO SCALE

Work out which box is the best value.
You must show all your working.

Box ..... [3]

7 **(a)** The diagram shows a regular polygon.



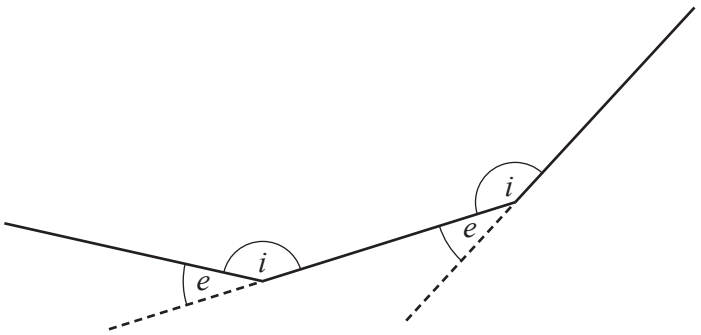
(i) Write down the mathematical name for this shape.

..... [1]

(ii) Write down the order of rotational symmetry of this shape.

..... [1]

(b) The diagram shows part of a different regular polygon.



NOT TO SCALE

e is an exterior angle.
i is an interior angle.

The ratio $e : i = 2 : 13$.

(i) Work out angle e.

..... [3]

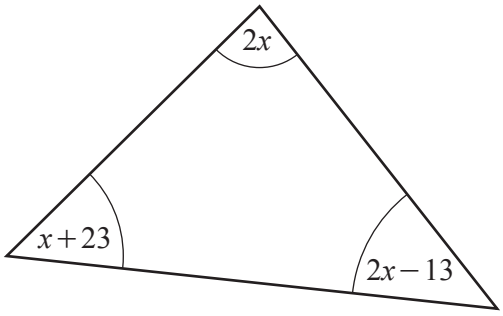
(ii) Work out the number of sides of this regular polygon.

..... [1]

(c) **Using a straight edge and compasses only**, construct the equilateral triangle ABC.
Side AB has been drawn for you.

[2]

(d) In this part, all angles are in degrees.



NOT TO
SCALE

(i) Use the information in the triangle to write down an equation in terms of x.

..... [1]

(ii) Solve this equation to find the value of x.

$x =$ ..... [3]

(iii) Work out the size of the smallest angle in the triangle.

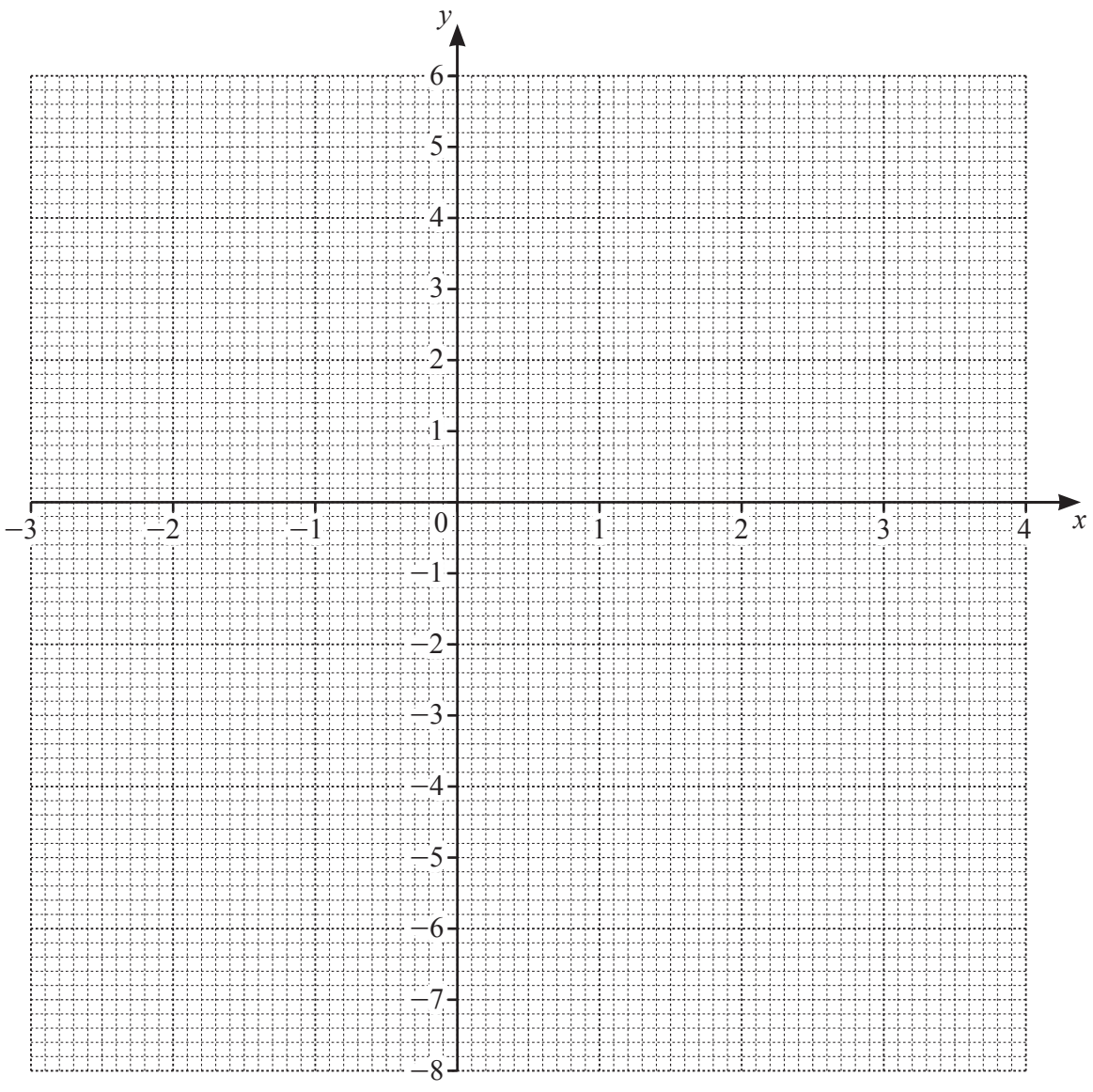
..... [2]

8 **(a)** Complete the table of values for $y = -x^2 + x + 5$.

x	-3	-2	-1	0	1	2	3	4
y		-1	3			3		

[3]

(b) On the grid, draw the graph of $y = -x^2 + x + 5$ for $-3 \leqslant x \leqslant 4$.



[4]

(c) Write down the coordinates of the highest point of the graph.

(..... , ...) [1]

(d) Write down the equation of the line of symmetry of the graph.

..... [1]

(e) (i) On the grid, draw the line $y = x$ for $-3 \leqslant x \leqslant 4$. [1]

(ii) Write down the values of x where the line $y = x$ crosses the curve $y = -x^2 + x + 5$.

$x =$ ..... and $x =$ ..... [2]

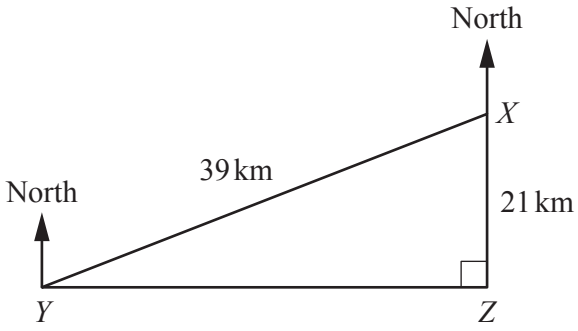
Question 9 is printed on the next page.

9 **(a)** A speedboat travels at 84 kilometres per hour.

Change this speed into metres per minute.

..... m/min [2]

(b)



NOT TO SCALE

The speedboat starts at X and travels to Y, then to Z and then back to X.
Z is due south of X and Y is due west of Z.
$XY = 39$ km and $XZ = 21$ km.

(i) Calculate YZ.

$YZ =$ ..... km [3]

(ii) Calculate angle YXZ.

Angle $YXZ =$ ..... [2]

(iii) Find the bearing of Y from X.

..... [1]