Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

MATHEMATICS **1521/32**

Paper 3 (Core) **May/June 2021**

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. Any blank pages are indicated.

[Turn over

1 In a triathlon, athletes swim 1.5 km, cycle 40 km and run 10 km.

(a) Write the fraction $\dfrac{\text{distance run}}{\text{total distance}}$ in its simplest form.

.... [2]

(b) Joseph competes in this triathlon.
His times, in minutes, for each event are in this ratio.

$$\text{swim : cycle : run} = 25 : 65 : 45$$

(i) Write this ratio in its simplest form.

swim : cycle : run = ... : .... : .... [1]

(ii) Joseph takes 135 minutes to complete this triathlon.

Write this time in hours.

.... h [1]

(iii) Show that Joseph's average speed for this triathlon was 22.9 km/h, correct to 1 decimal place.

[3]

(iv) In his next triathlon, Joseph's total time was 125 minutes.

Calculate the percentage reduction from his time of 135 minutes.

.... % [3]

(c) In another triathlon, Joseph started at 11 55 and finished at 14 03.

How many minutes did he take to complete this triathlon?

.... min [1]

2 **(a)** For each sequence, find the next two terms and the term to term rule.

    (i)   2,   −6,   18,   −54,   …

        .... , ... rule .... [3]

    (ii)   2,   3,   6,   11,   18,   …

        .... , ... rule .... [3]

(b) Here are the first four terms of another sequence.

               7   5   3   1

    (i) Write down the next two terms.

                                         .... , ... [2]

    (ii) Give the reason why part of the expression for the nth term is $-2n$.

        .... [1]

    (iii) Write down the expression for the nth term.

                                     .... [1]

    (iv) A term in this sequence is −33.

        Calculate the value of n for this term.

                          $n =$ .... [2]

3 The diagram shows a shaded polygon and three other polygons *A*, *B* and *C*.
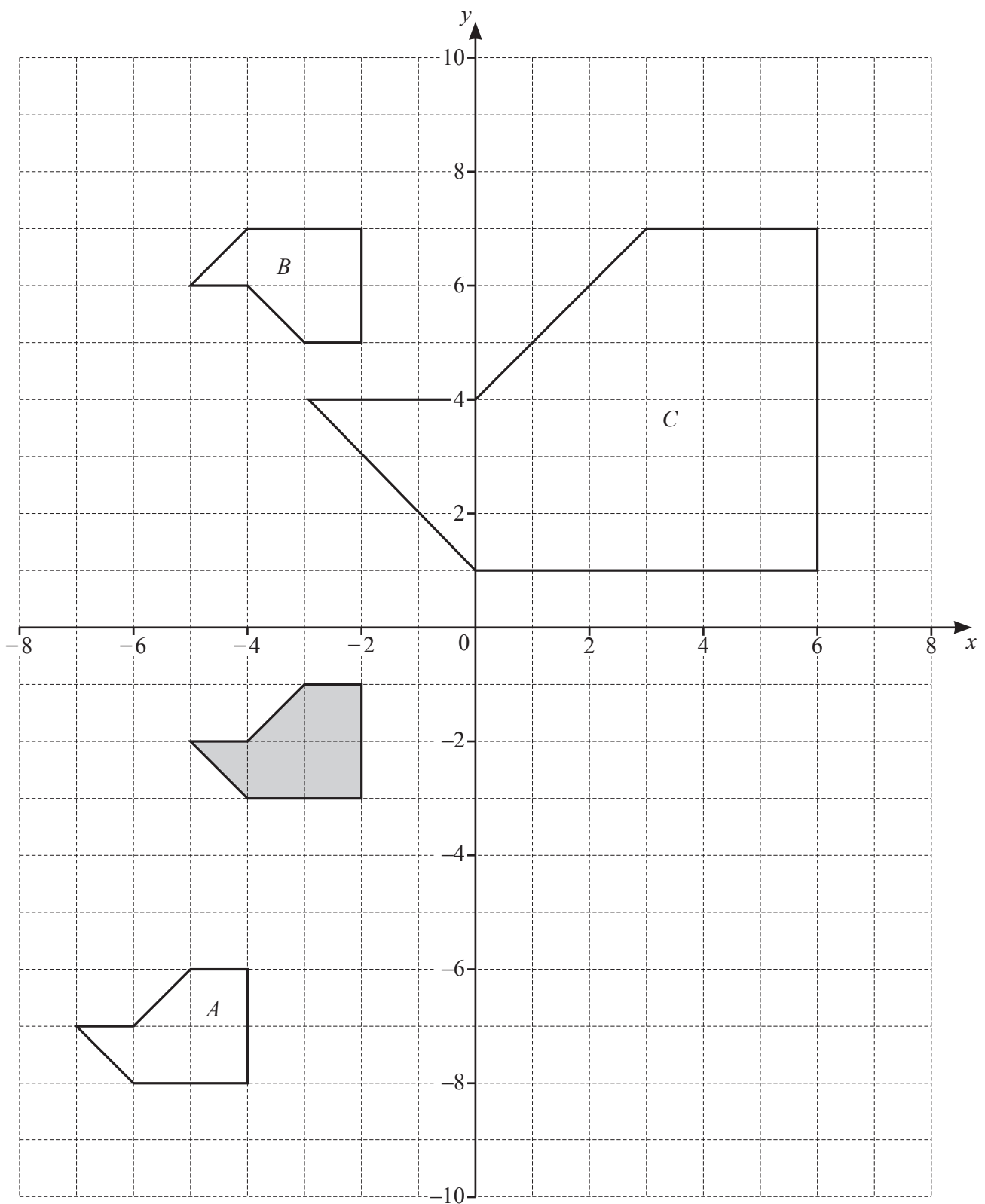
(a) (i) Write down the mathematical name of the shaded polygon.

.... [1]

(ii) Find the sum of the interior angles of the shaded polygon.

.... [2]

(b) Describe fully the **single** transformation that maps

(i) the shaded polygon onto polygon *A*,

....

.... [2]

(ii) the shaded polygon onto polygon *B*,

....

.... [2]

(iii) the shaded polygon onto polygon *C*.

....

.... [3]

(c) On the grid, draw the image of the shaded polygon after a rotation through 90° anticlockwise, centre (0, 0).   [2]

4 Ibrahim drives a taxi.
The table shows the number of times his taxi is hired during one week.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Number of times hired	8	9	6	4	15	17	11

(a) (i) Calculate the mean number of times Ibrahim's taxi is hired.

.... [2]

(ii) Draw a bar chart to show the information in the table.
Complete the scale on the vertical axis.

Number of times hired

Day
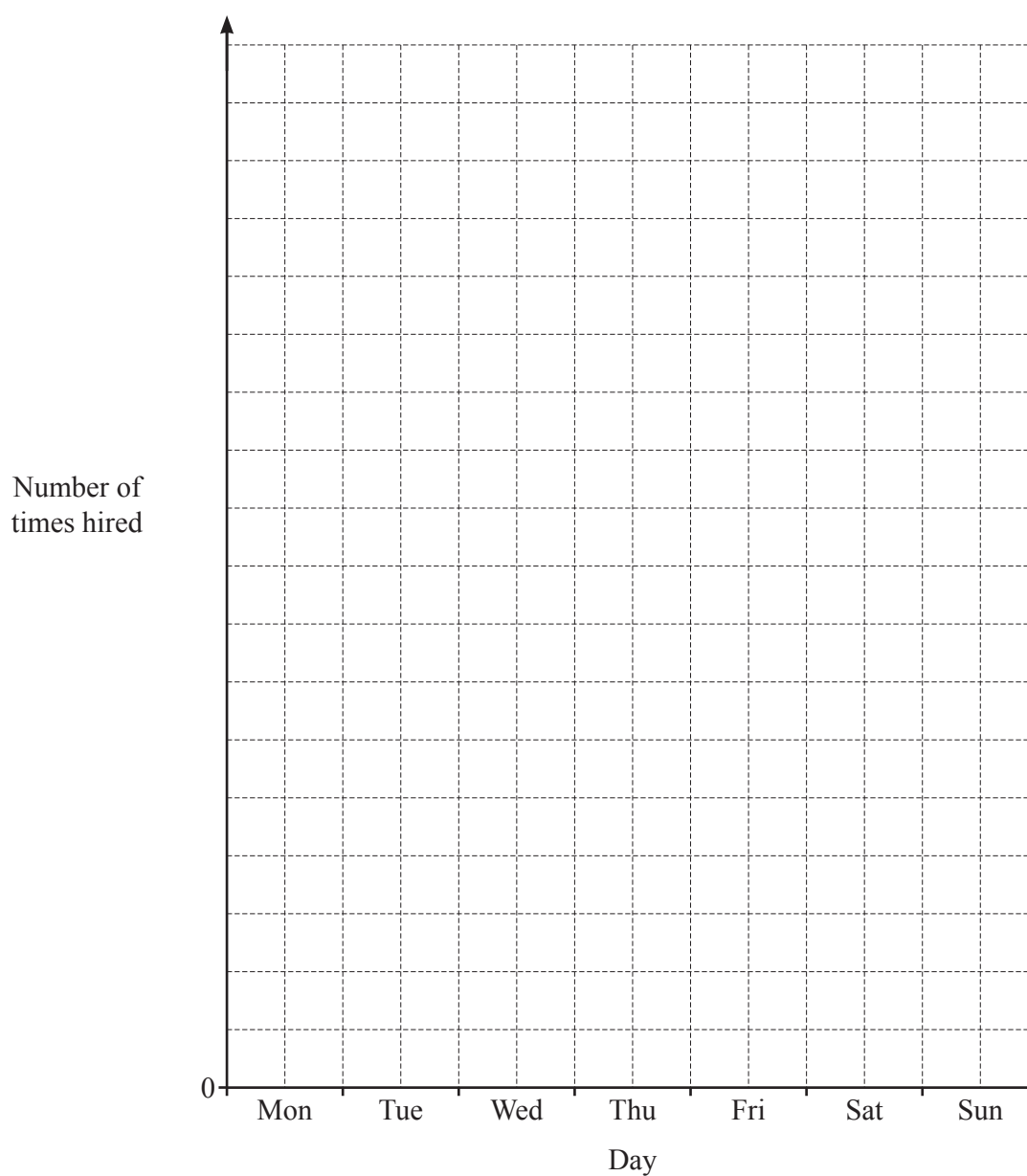
[3]

(b) Ibrahim records the amount of money he collects in one week.
The table shows some of this information.

Days	Mon and Tue	Wed and Thu	Fri, Sat and Sun
Amount collected ($)	320	190	
Pie chart sector angle	128°		

(i) The total amount he collects for this week is $900.

Show that the amount he collects on Friday, Saturday and Sunday is $390.

[1]

(ii) Ibrahim wants to show these results on a pie chart.

Complete the table.

[2]

(iii) Complete the pie chart.
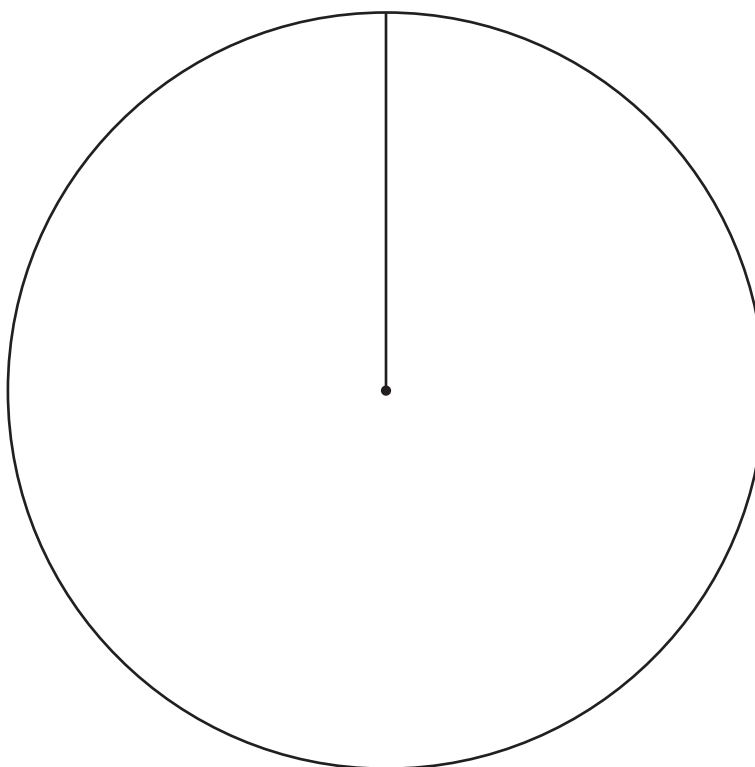
[2]

5   **(a)** Complete the table of values for $y = x^2 + x - 3$.

x	–4	–3	–2	–1	0	1	2	3
y	9			–3	–3		3	

[3]

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

[4]

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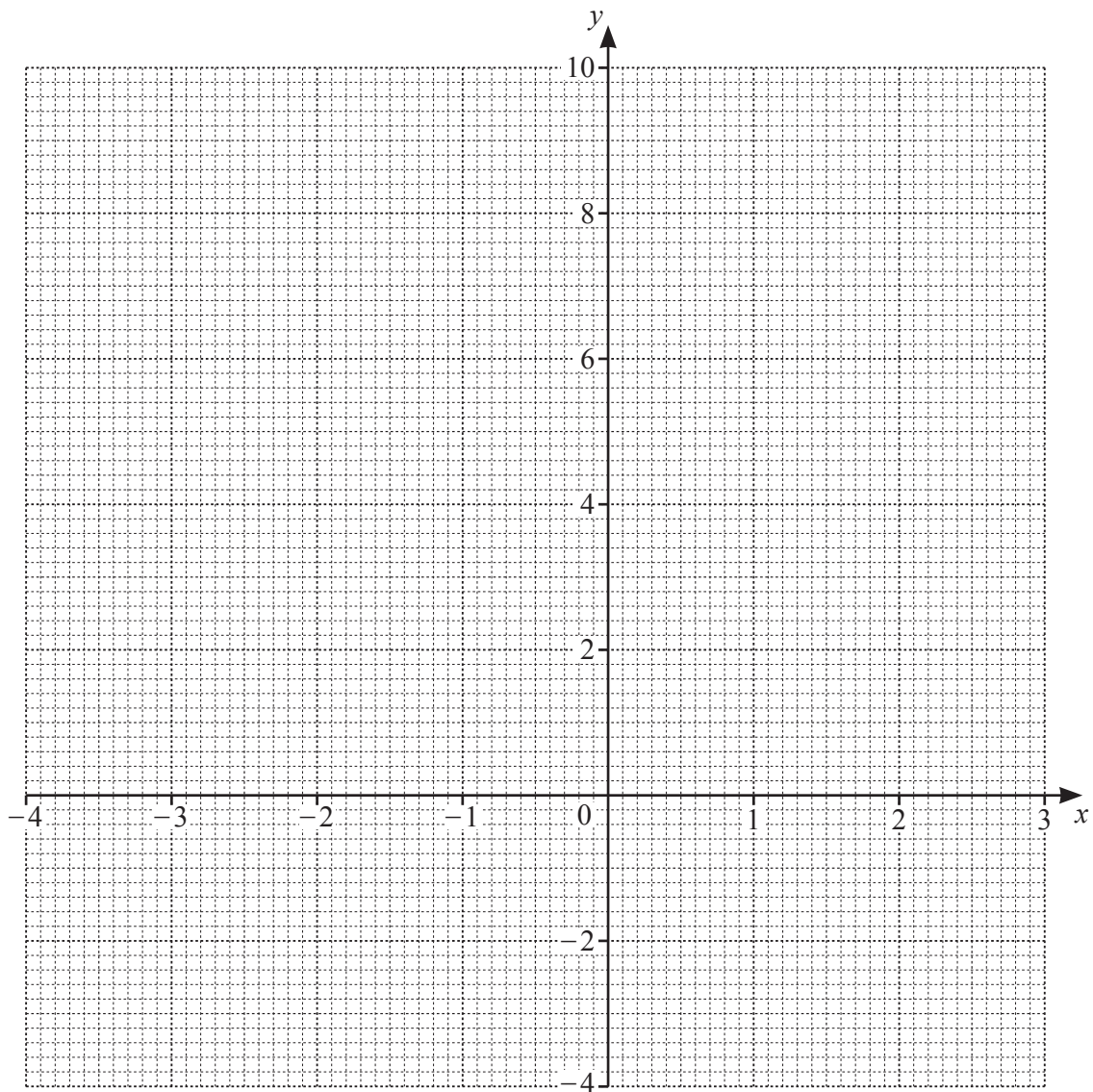
(c) Write down the coordinates of the lowest point of your graph.

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

(d) (i) On the grid, draw the line of symmetry of your graph. [1]

(ii) Write down the equation of the line of symmetry.

.... [1]

6 **(a)** Work out the value of $25^2 \div \sqrt{625}$.

.... [2]

(b) Find the value of $\sqrt[3]{29\,791}$.

.... [1]

(c) Write down an irrational number.

.... [1]

(d) Write 315 as the product of its prime factors.

.... [2]

(e) **(i)** Find the highest common factor (HCF) of 28 and 70.

.... [2]

(ii) Find the lowest common multiple (LCM) of 28 and 70.

.... [2]

(f) Write 4^{-3} as

(i) a fraction,

.... [1]

(ii) a decimal, correct to 2 significant figures.

.... [2]

7 **(a)** Make b the subject of the formula $5b - c = a$.

$b =$ .... [2]

(b) Expand and simplify.
$$4(x+3) - 3(2x+1)$$

.... [2]

(c) Factorise completely.
$$10x^2 - 15xy$$

.... [2]

(d) Solve the equation.
$$5x - 8 = 3x + 4$$

$x =$ .... [2]

(e)
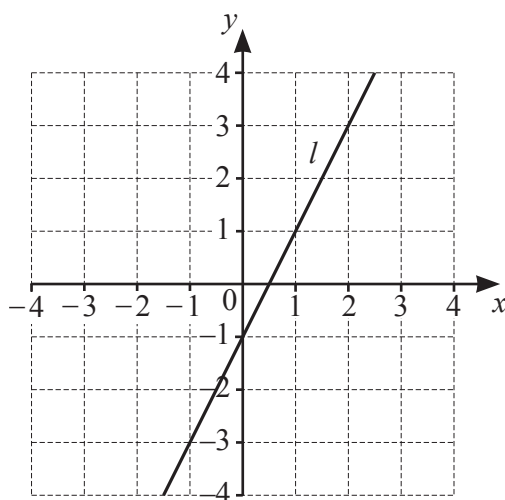
Find the gradient of the line l.

.... [2]

     [Turn over

8 An area of land is in the shape of a quadrilateral *ABCD*.
The scale drawing shows the positions of *A*, *B* and *C*.
B is 120 metres from *A* on a bearing of 060°.
The scale is 1 centimetre represents 20 metres.

Scale: 1 cm to 20 m

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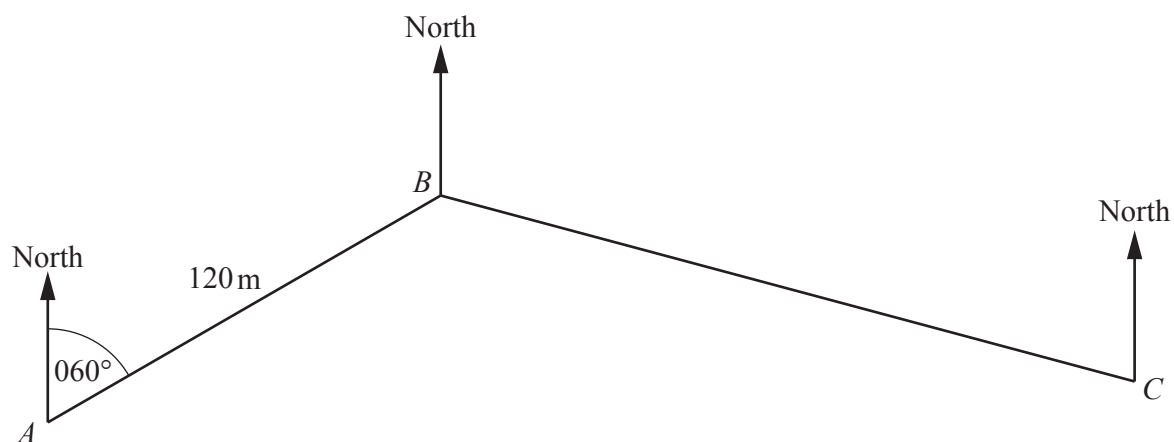
(a) (i) Find the actual distance *BC*.

$BC =$ .... m [2]

(ii) Measure the bearing of *C* from *B*.

.... [1]

(b) *D* is the point such that

- angle $BCD = 60°$

and

- $CD = 210$ metres.

Complete the quadrilateral *ABCD*.   [3]

(c) *E* is a point on *CD*, 4.5 cm from *C*.

(i) Draw an arc of a circle, centre *C*, radius *CE*, from the line *CD* to the line *CB*.   [2]

(ii) Calculate the length of this arc with sector angle 60°.

.... cm [2]

9
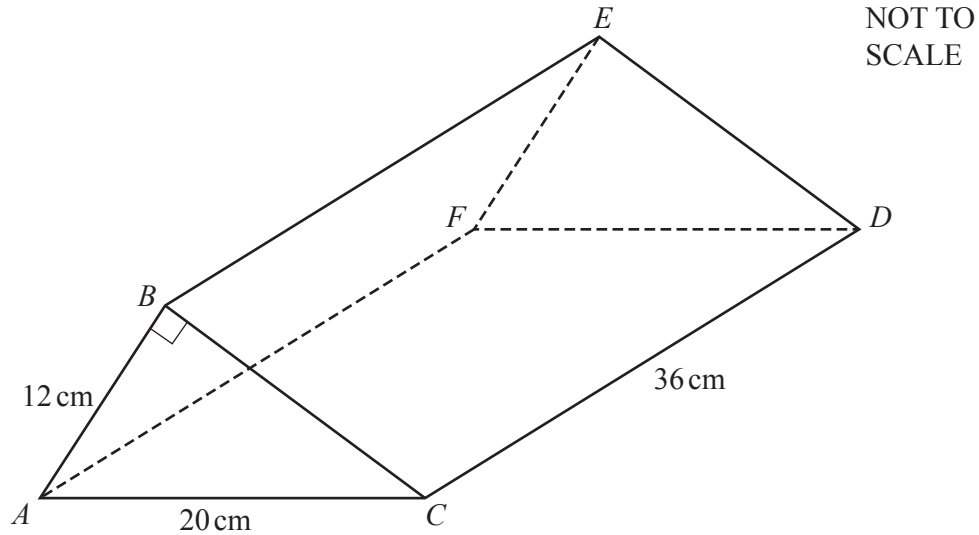
The diagram shows a triangular prism.
$AB = 12$ cm, $AC = 20$ cm, $CD = 36$ cm and angle $ABC = 90°$.

(a) (i) Calculate *BC*.

$BC =$ .... cm [3]

(ii) Use trigonometry to calculate angle *CAB*.

Angle $CAB =$ .... [2]

(b) (i) Calculate the volume of the prism.

.... cm^3 [3]

(ii) Calculate the total surface area of the prism.
Give the units of your answer.

.... [3]

(iii) Work out the value of k where

the area of rectangle $ACDF = k \times$ the area of triangle ABC.

$k =$ .... [2]

(c) A model of the prism is made using the scale 1 centimetre represents 4 centimetres.
On the $1\,\text{cm}^2$ grid, complete the net of this model.

[3]

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