Cambridge Assessment International Education

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4089846623

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/31**

Paper 3 (Core) **May/June 2022**

1 hour 45 minutes

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 graphic display calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
- 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 your calculator value.

INFORMATION

- The total mark for this paper is 96.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages.

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Formula List

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle, radius r.	$A = \pi r^2$
Circumference, C, of circle, radius r.	$C = 2\pi r$
Curved surface area, A, of cylinder of radius r, height h.	$A = 2\pi rh$
Curved surface area, A, of cone of radius r, sloping edge l.	$A = \pi rl$
Curved surface area, A, of sphere of radius r.	$A = 4\pi r^2$
Volume, V, of prism, cross-sectional area A, length l.	$V = Al$
Volume, V, of pyramid, base area A, height h.	$V = \frac{1}{3}Ah$
Volume, V, of cylinder of radius r, height h.	$V = \pi r^2 h$
Volume, V, of cone of radius r, height h.	$V = \frac{1}{3}\pi r^2 h$
Volume, V, of sphere of radius r.	$V = \frac{4}{3}\pi r^3$

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Answer **all** the questions.

1 **(a)** Write the number 20 202 in words.

..... [1]

(b) Work out.

$$\frac{6.27 + 2.48}{1.75}$$

..... [1]

(c) Write down all the factors of 42.

..... [2]

(d) Write down a prime number between 15 and 20.

..... [1]

(e) Write 7832.948

(i) correct to 2 decimal places,

..... [1]

(ii) correct to 4 significant figures,

..... [1]

(iii) correct to the nearest 100.

..... [1]

(f) Insert the symbols $(\ ), +, -, \times$ so that the following statement is correct.

$$5 \quad 3 \quad 4 \quad 1 = 9$$ [1]

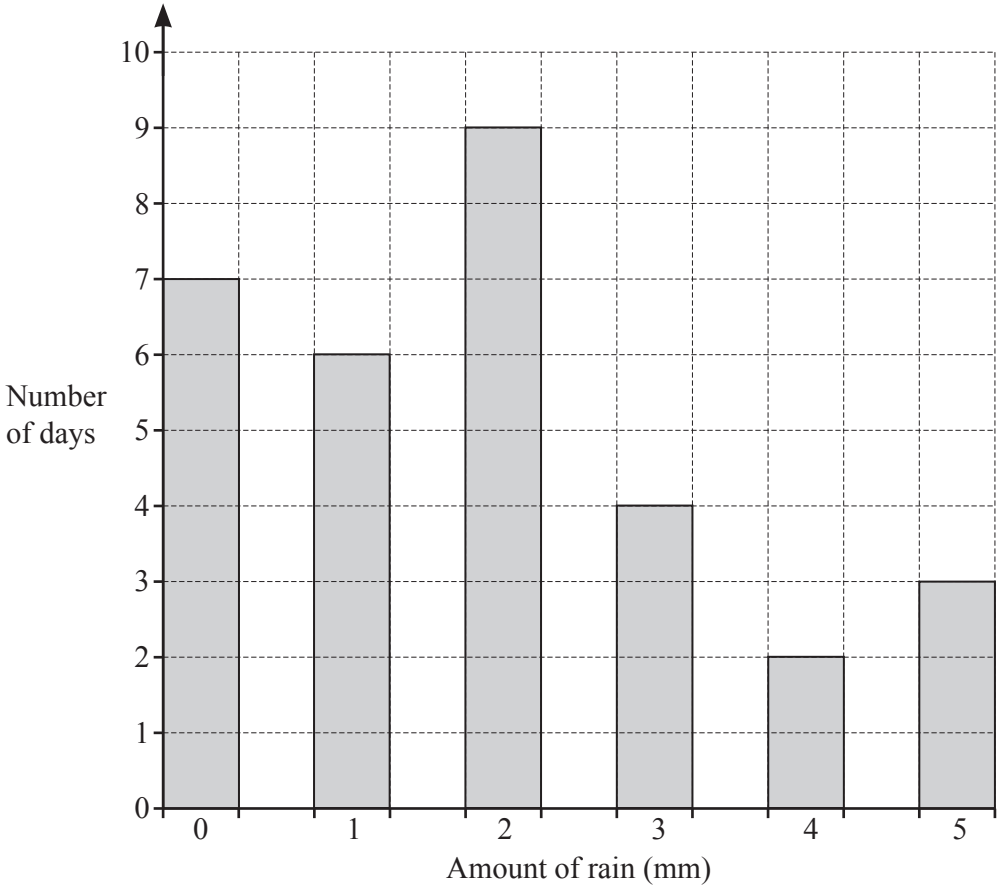
(g) Jeffrey invests $550 for 3 years at a rate of 3.2% per year simple interest.

Work out the interest he receives.

$ ..... [2]

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2 Wim measures the amount of rain, in mm, each day for 31 days.
The bar chart shows his results.



(a) Write down the mode.

..... mm [1]

(b) Write down the number of days that had no rain.

..... [1]

(c) Work out the mean amount of rain per day.

..... mm [2]

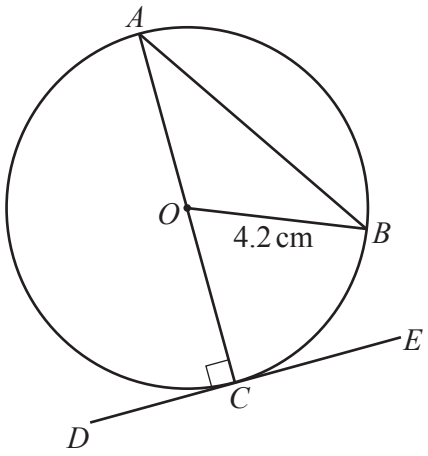
(d) Wim picks one of these days at random.

Find the probability that, on that day, the amount of rain was 3 mm or more.

..... [1]

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3



NOT TO SCALE

The diagram shows a circle, centre O, radius 4.2 cm.
A, B and C are points on the circle.
The line DE touches the circle at C.

(a) Write down the mathematical name for each of these straight lines.

AC is a .....

DE is a .....

AB is a ..... [3]

(b) Work out

(i) the circumference of the circle,

..... cm [2]

(ii) the area of the circle.

..... cm^2 [2]

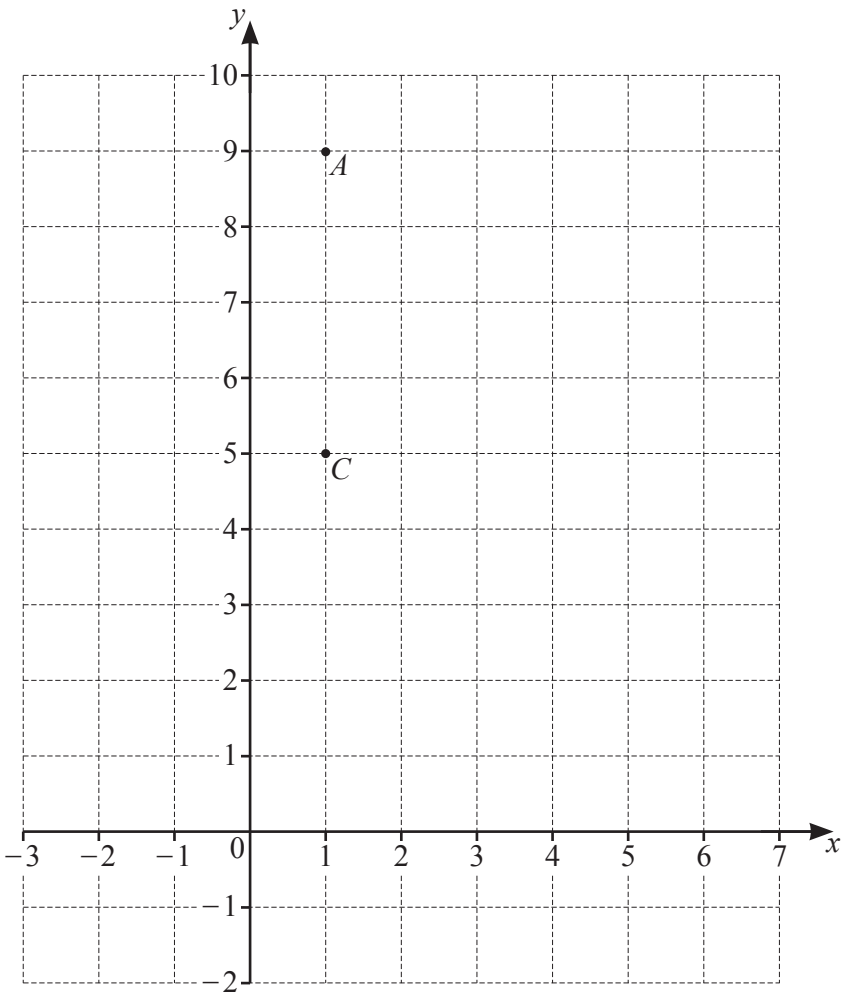
(c) Angle $AOB = 110°$.

Calculate the area of sector AOB.

..... cm^2 [2]

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4



The diagram shows point A and point C plotted on a 1 cm^2 grid.

(a) Plot point $B\,(5, 7)$ and point $D\,(-1, 7)$ and draw the quadrilateral $ABCD$. [2]

(b) **(i)** Find the length of AC.

$AC =$ ..... cm [1]

(ii) Use Pythagoras' Theorem to find the length of AB.

$AB =$ ..... cm [2]

(c) Write down the mathematical name for quadrilateral $ABCD$.

..... [1]

(d) Reflect quadrilateral $ABCD$ in the line $y = 4$. [2]

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5 **(a)** Solve.

(i) $6x = 96$

$x =$ ..... [1]

(ii) $7x - 6 = -13$

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

(b) Simplify.

(i) $5r - 2r - r$

..... [1]

(ii) $4a - 3b - 7a + 2b$

..... [2]

(c) $T = 4m + 2n$

Find

(i) the value of T when $m = 1.8$ and $n = -0.3$,

$T =$ ..... [2]

(ii) the value of n when $T = 26$ and $m = 3.4$.

$n =$ ..... [2]

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6 30 members of a sports club were asked what their favourite game was.
They could choose from tennis (T), squash (S) or badminton (B).
These are the results.

B	T	S	S	T	S	B	B	T	S
S	S	S	T	T	T	S	S	B	T
B	T	S	S	T	T	B	S	S	T

(a) Complete the frequency table.

Game	Frequency
Tennis (T)	
Squash (S)	
Badminton (B)	

[2]

(b) Find how many more members chose tennis than badminton.

..... [1]

(c) One of the 30 members is chosen at random.

Write down the probability that this member chose squash.

..... [1]

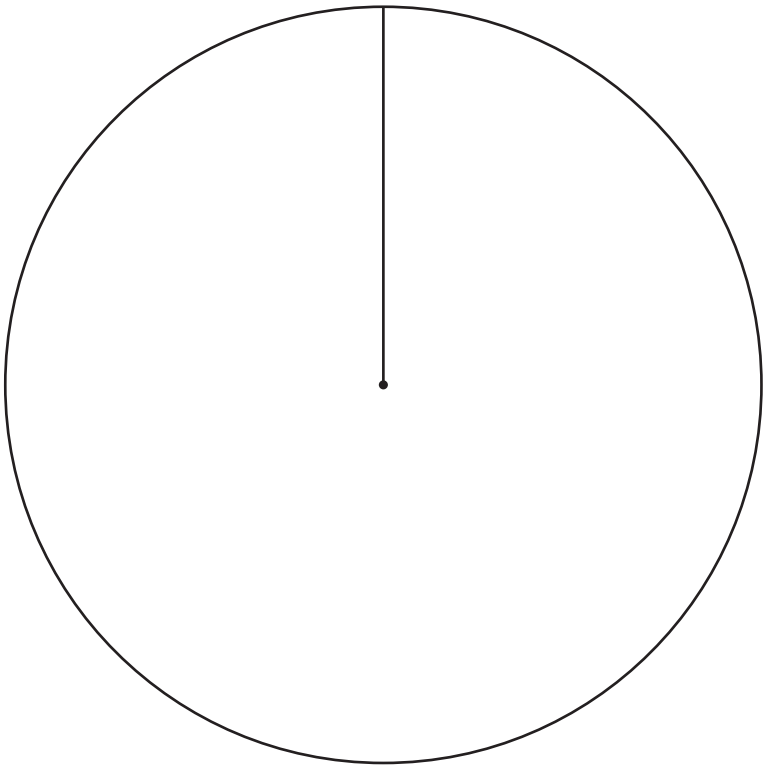
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(d) Shadana begins to draw a pie chart to show the results.

(i) Show that the sector angle for tennis is 132°.

[2]

(ii) Complete the pie chart for Shadana.



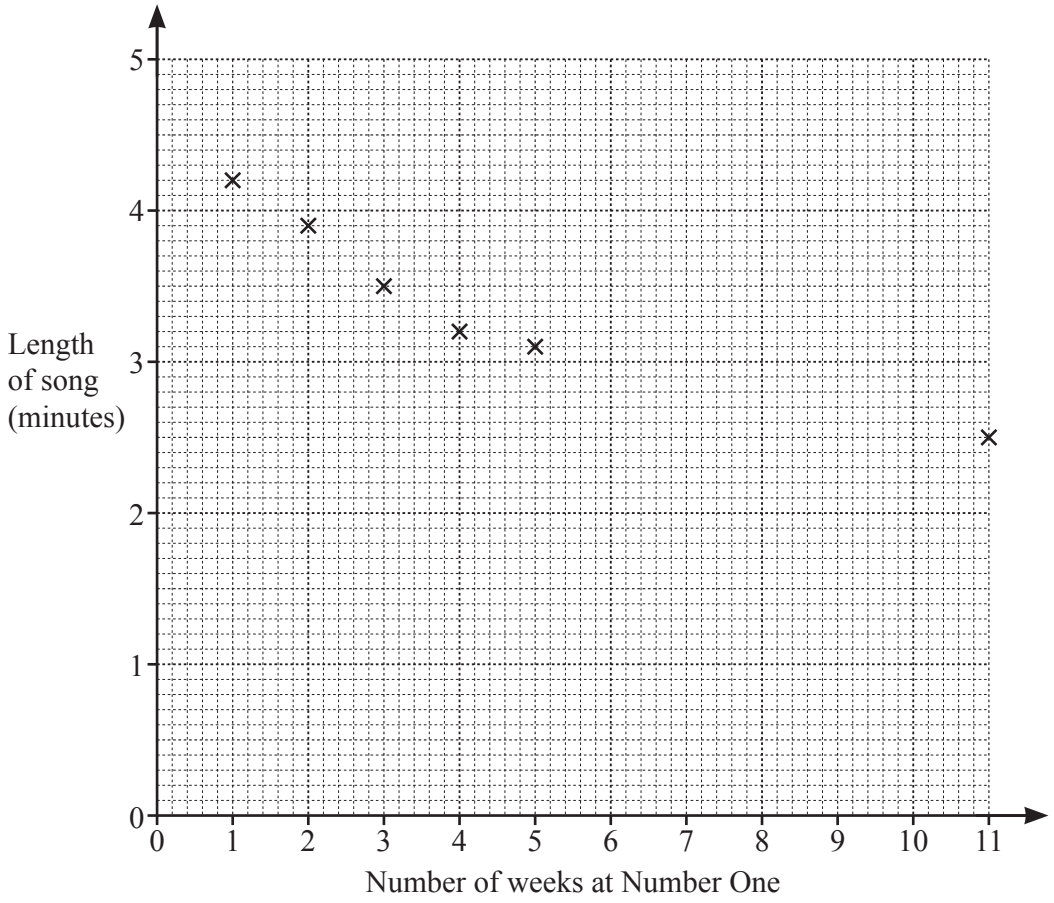
[3]

7 Gheza wants to know if the number of weeks that a song is Number One in the charts is related to the length of the song, in minutes.

The table shows the results for one year.

Number of weeks at Number One	3	2	1	5	4	11	7	4	3	3	9
Length of song (minutes)	3.5	3.9	4.2	3.1	3.2	2.5	2.9	3.0	3.4	3.7	2.9

(a) Complete the scatter diagram.
The first 6 points have been plotted for you.



[2]

(b) What type of correlation is shown in the diagram?

..... [1]

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(c) Find

(i) the mean number of weeks at Number One,

..... [1]

(ii) the mean length of a song.

..... min [1]

(d) On the scatter diagram, draw a line of best fit. [2]

8 **(a)** The nth term of a sequence is $2n^2 + 3$.

Write down the first three terms of this sequence.

..... , ... , ... [2]

(b) These are the first four terms of a different sequence.

$5 \qquad -3 \qquad -11 \qquad -19$

(i) Find the next two terms of the sequence.

..... , ... [2]

(ii) Find the nth term of the sequence.

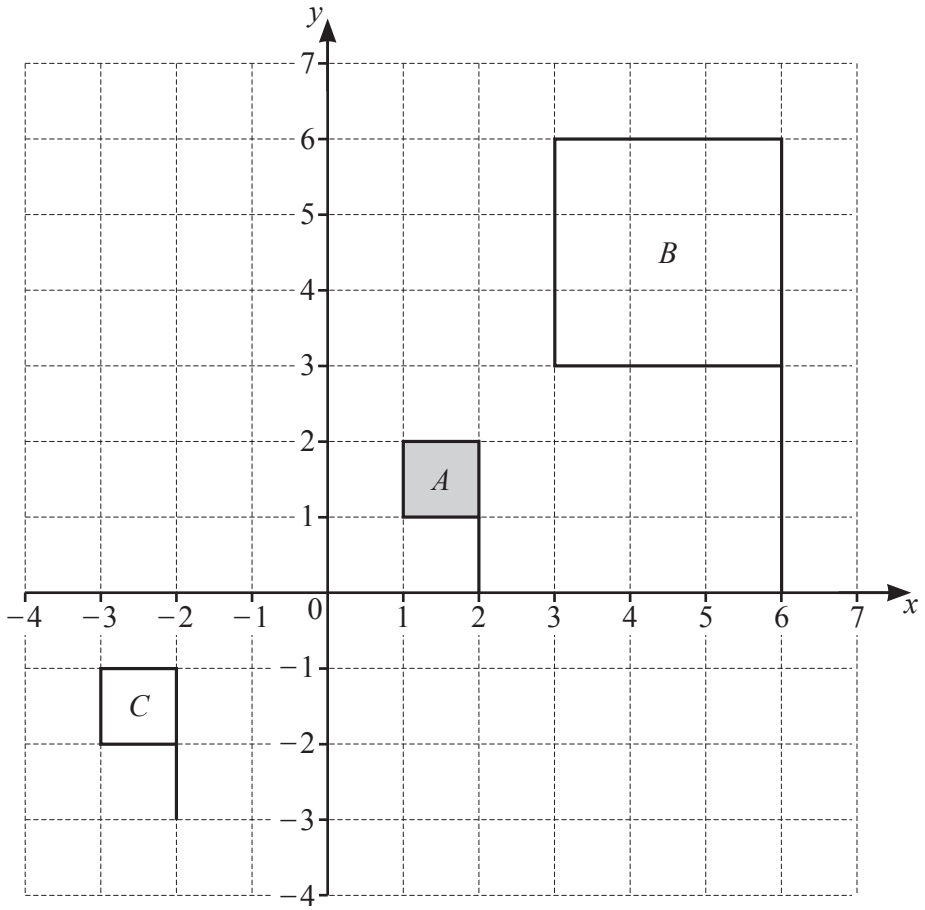
..... [2]

(iii) Sanjay says that -101 is a term of the sequence.

Show that he is not correct.

[2]

9



(a) Describe fully the **single** transformation that maps shape *A* onto shape *B*.

.....

..... [3]

(b) Describe fully the **single** transformation that maps shape *A* onto shape *C*.

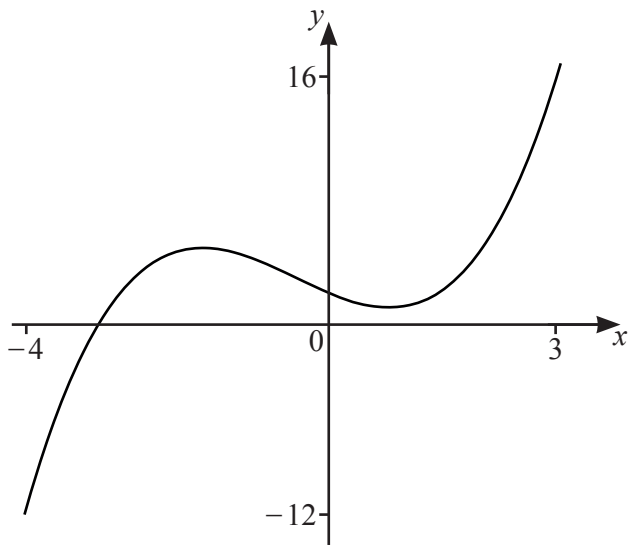
.....

..... [2]

(c) Rotate shape *A* 90° clockwise about (0, 0).

[2]

10



NOT TO SCALE

The diagram shows a sketch of the graph of

$$y = 0.5x^3 + 0.65x^2 - 2x + 2 \quad \text{for } -4 \leqslant x \leqslant 3.$$

(a) Find the coordinates of the point where the graph crosses the y-axis.

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

(b) Find the coordinates of the point where the graph crosses the x-axis.

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

(c) Find the coordinates of the local maximum.

(..... , ...) [2]

(d) Find the coordinates of the local minimum.

(..... , ...) [2]

(e) On the diagram, sketch the graph of $y = 8$. [1]

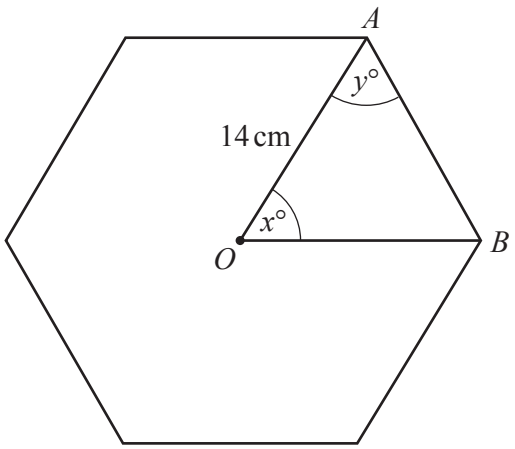
(f) Solve this equation.

$$0.5x^3 + 0.65x^2 - 2x + 2 = 8.$$

$x =$ ..... [1]

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11



NOT TO SCALE

The diagram shows a regular hexagon with centre O and $OA = OB = 14\,\text{cm}$.

(a) Work out the size of angle x and the size of angle y.

$x =$ .....

$y =$ ..... [2]

(b) Write down the length of AB.

$AB =$ ..... cm [1]

(c) Work out the area of triangle AOB.

..... cm^2 [3]

The regular hexagon is the cross-section of a prism.
The length of the prism is 5 cm.

(d) Work out the volume of the prism.

..... cm^3 [2]

Question 12 is printed on the next page.

12 Ruben's house is 1.3 km from the supermarket.

(a) He walks to the supermarket at a speed of 5 km / h.

Work out how long it takes him.
Give your answer in minutes and seconds.

..... min ..... s [3]

(b) On another day, Ruben cycles to the supermarket in a time of 5 minutes 12 seconds.

(i) Show that 12 seconds = 0.2 minutes.

[1]

(ii) Work out Ruben's average speed when cycling to the supermarket.
Give your answer in km / h.

..... km / h [2]

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