Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

9855804838

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/43**

Paper 4 (Extended) **May/June 2014**

2 hours 15 minutes

Candidates answer on the Question Paper.

Additional Materials: Geometrical Instruments
Graphics Calculator

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
Do not use staples, paper clips, glue or correction fluid.
You may use an HB pencil for any diagrams or graphs.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** the questions.
Unless instructed otherwise, give your answers exactly or correct to three significant figures as appropriate.
Answers in degrees should be given to one decimal place.
For π, use your calculator value.
You must show all the relevant working to gain full marks and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is 120.

This document consists of **20** printed pages.

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Formula List

For the equation $ax^2 + bx + c = 0$ $\quad x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Curved surface area, A, of cylinder of radius r, height h. $\quad A = 2\pi rh$

Curved surface area, A, of cone of radius r, sloping edge l. $\quad A = \pi rl$

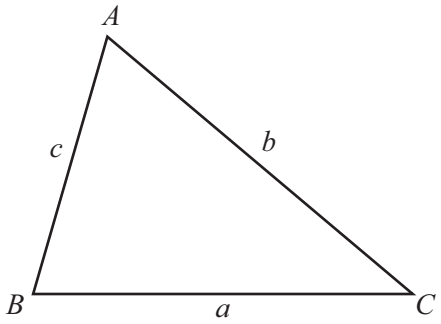
Curved surface area, A, of sphere of radius r. $\quad A = 4\pi r^2$

Volume, V, of pyramid, base area A, height h. $\quad V = \dfrac{1}{3}Ah$

Volume, V, of cylinder of radius r, height h. $\quad V = \pi r^2 h$

Volume, V, of cone of radius r, height h. $\quad V = \dfrac{1}{3}\pi r^2 h$

Volume, V, of sphere of radius r. $\quad V = \dfrac{4}{3}\pi r^3$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$\text{Area} = \frac{1}{2}bc\sin A$$

Answer **all** the questions.

1 On January 1st 2014 the value of a house was \$230 000.
The value of the house increases at a rate of 4.5% of its value each year.

(a) Calculate the value of the house, in 10 years time, on January 1st 2024.
Give your answer correct to the nearest hundred dollars.

Answer(a) \$ ..... [3]

(b) Calculate the whole number of years, from January 1st 2014, it takes for the value of the house to exceed one million dollars.

Answer(b) ..... [3]

(c) Calculate the percentage change in the value of the house when it increases from \$230 000 to \$1 000 000.

Answer(c) ..... % [3]

2 The five members of the Schmidt family go by car on a day trip to a mountain resort in France.

(a) The family leave home at 07 55.
They travel 50 km at an average speed of 100 km/h and then 30 km at an average speed of 40 km/h.

(i) At what time does the family arrive at the mountain resort?

Answer(a)(i) ..... [3]

(ii) Calculate the average speed of the journey.

Answer(a)(ii) ..... km/h [2]

(iii) The car uses fuel at an average rate of 9.5 litres per 100 kilometres.
The cost of fuel is €1.60 per litre.

Calculate the cost of the fuel used during the journey.

Answer(a)(iii) € ..... [2]

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(b) The family consists of 2 adults and 3 children.
They take a cable car ride and buy lunch.
The tickets for the cable car cost €8.80 for each adult and €5.50 for each child.
The cost of lunch for each person is €6.25 .

Calculate the **total** cost of the cable car tickets and the lunches for the family.

Answer(b) € ..... [2]

(c) The family also spends another €24.23 in total during the day.
When the family returns home, the car uses the same amount of fuel.

Calculate the average cost **per person** of the **whole** day trip.

Answer(c) € ..... [2]

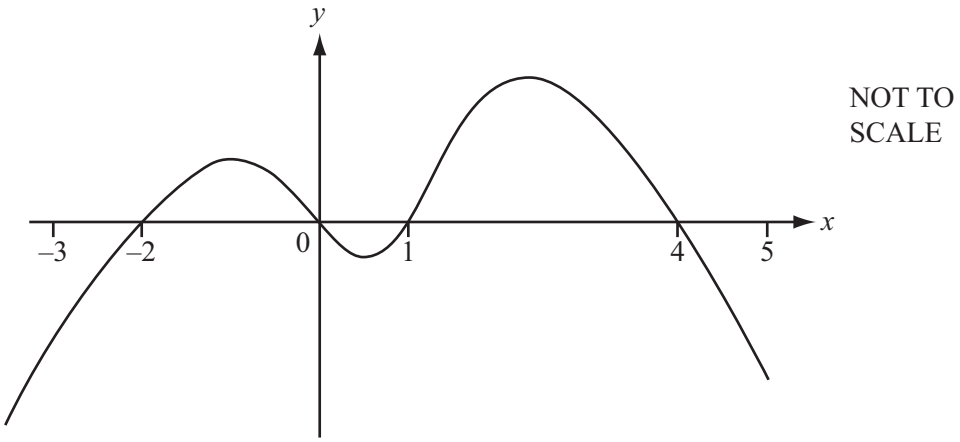
3 **(a)**



Write down the inequality shown by the number line.

Answer(a) ..... [2]

(b)



The diagram shows the graph of $y = f(x)$.

Solve the inequality $f(x) > 0$.

Answer(b) ..... [3]

(c) Solve the equation.

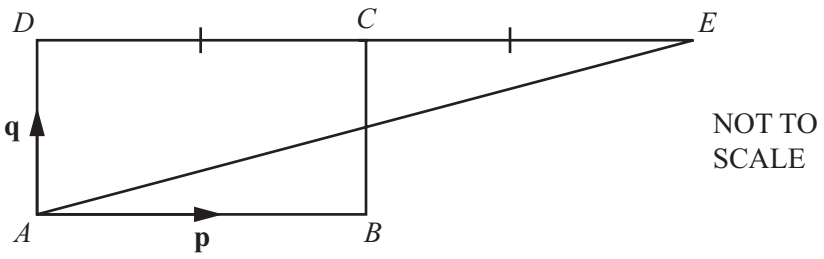
$$x^2 + 4x + 2 = 0$$

Give your answers correct to 2 decimal places.

Answer(c) $x =$ ..... or $x =$ ..... [3]

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4



ABCD is a rectangle, *DCE* is a straight line and $DC = CE$.
$\overrightarrow{AB} = \mathbf{p}$ and $\overrightarrow{AD} = \mathbf{q}$.

(a) Find, in terms of **p** and **q**,

(i) $\overrightarrow{BD}$,

Answer(a)(i) ..... [1]

(ii) $\overrightarrow{AE}$.

Answer(a)(ii) ..... [1]

(b) In the diagram above, *A* is the point (3, 3), *B* is the point (6, 3) and *C* is the point (6, 5).

(i) Find the co-ordinates of *E*.

Answer(b)(i) (..... , ...) [2]

(ii) Find the equation of the straight line which passes through *A* and *E*.
Give your answer in the form $ax + by = d$ where *a*, *b* and *d* are integers.

Answer(b)(ii) ..... [4]

5 The table shows the test marks of 10 students in geography (g) and science (s).

Student	A	B	C	D	E	F	G	H	I	J
Geography (g)	48	60	72	57	63	39	44	84	41	73
Science (s)	70	55	65	41	74	81	42	63	57	55

(a) Find the median and the quartiles of the geography test marks.

Answer(a) median = ...

lower quartile = ...

upper quartile = ... [3]

(b) Find the mean mark for each subject.

Answer(b) Geography .....

Science ..... [2]

(c) Find the equation of the linear regression line, giving s in terms of g.

Answer(c) s = ... [2]

(d) (i) Use the equation in **part (c)** to predict the science mark when the geography mark is 54.

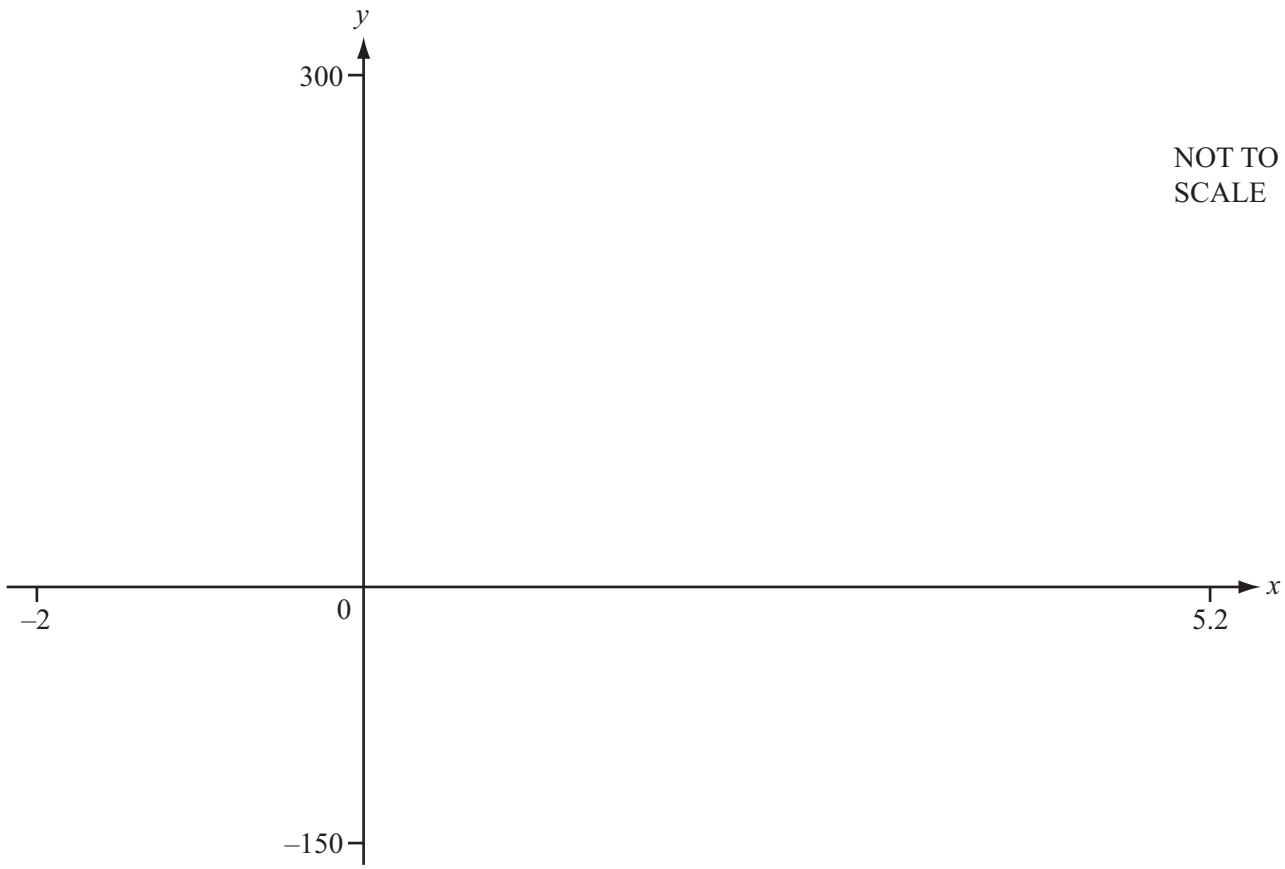
Answer(d)(i) ..... [1]

(ii) Explain briefly why the answer to **part (d)(i)** may not be reliable.

Answer(d)(ii) ..... [1]

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6



$f(x) = 5x^4 - x^5$ for $-2 \leqslant x \leqslant 5.2$

(a) On the diagram, sketch the graph of $y = f(x)$. [2]

(b) Find the zeros of $f(x)$.

Answer(b) ..... [2]

(c) Find the co-ordinates of the local maximum point.

Answer(c) (..... , ...) [1]

(d) Find the range of $f(x)$.

Answer(d) ..... [2]

(e) The equation $f(x) = k$, where k is an integer, has one solution.

Write down a possible value of k.

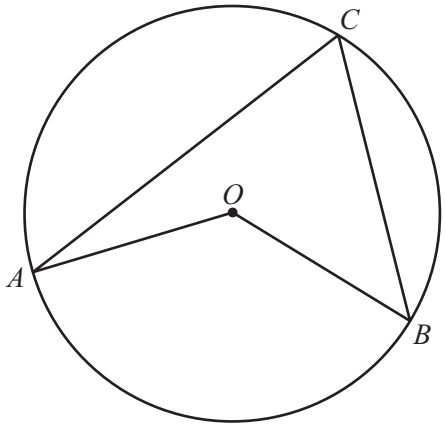
Answer(e) ..... [1]

7 **(a)** Five angles of an octagon are each 129°.
The other three angles are equal.

Calculate one of these three angles.

Answer(a) ..... [3]

(b)



NOT TO SCALE

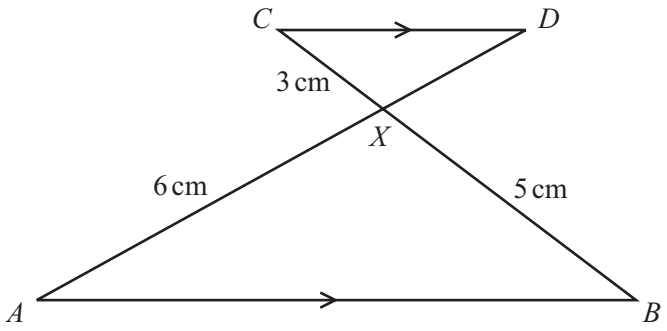
A, *B* and *C* lie on a circle, centre *O*.
The obtuse angle $AOB = (6x + 2)°$ and angle $ACB = (2x + 19)°$.

Find the value of x.

Answer(b) ..... [3]

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(c)



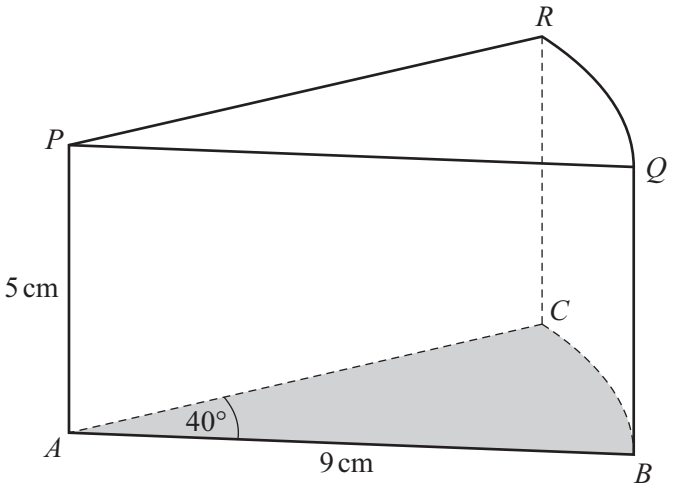
NOT TO SCALE

AB and *CD* are parallel.
AX = 6 cm, *BX* = 5 cm and *CX* = 3 cm.
The area of triangle *CXD* = 5.1 cm^2.

Calculate the area of triangle *AXB*.

Answer(c) ..... cm^2 [3]

8



NOT TO SCALE

The diagram shows a piece of cake.
The shape is a solid prism of height 5 cm.
The cross-section, ABC, is a sector of a circle, centre A, with radius 9 cm.
Angle $BAC = 40°$.

(a) Calculate

(i) the volume of the prism,

Answer(a)(i) ..... cm^3 [3]

(ii) the **total** surface area of the prism.

Answer(a)(ii) ..... cm^2 [5]

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(b) The piece of cake has a mass of 160 g.
It is cut from a circular cake.

Calculate the mass of the circular cake.
Give your answer in kilograms.

Answer(b) ..... kg [2]

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9 Use graphical methods to solve these equations.
Use $-2 \leqslant x \leqslant 4$ in each part and sketch your graphs.

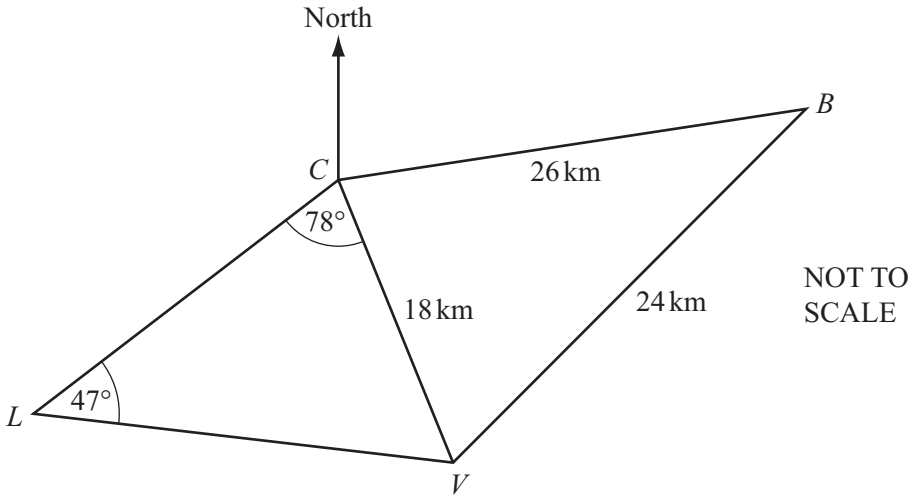
(a) $x^3 = 3^{-x}$

Answer(a) ..... [3]

(b) $x^2 - 2x - 3 = \log(x + 2)$

Answer(b) ..... [4]

10



The diagram shows straight line distances between Cherbourg (C), Barfleur (B), Valonges (V) and Les Pieux (L).

(a) Calculate angle BCV.
Show that it rounds to 63.06° correct to 4 significant figures.

[3]

(b) Calculate the distance LV.

Answer(b) ..... km [3]

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(c) **(i)** Calculate the shortest distance from V to BC.

Answer(c)(i) ..... km [2]

(ii) Calculate the area of triangle BCV.

Answer(c)(ii) ..... km^2 [2]

(d) The bearing of B from C is 084°.

Find the bearing of

(i) V from C,

Answer(d)(i) ..... [1]

(ii) C from V.

Answer(d)(ii) ..... [1]

11 **(a)** Write as a single fraction.

$$\frac{1}{2x-1}+\frac{3}{x-2}$$

Answer(a) ..... [3]

(b) Simplify fully, giving your answer as a single fraction.

$$\frac{x^3-x}{x^3+2x^2-3x}$$

Answer(b) ..... [5]

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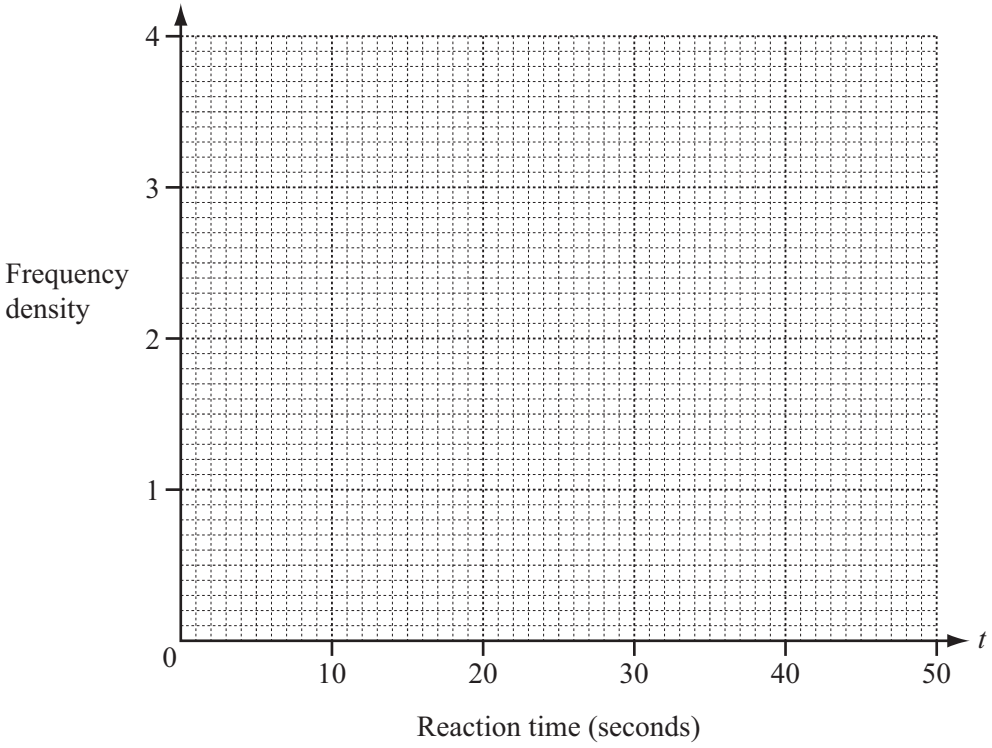
12 30 students carry out an experiment in a chemistry lesson.
Each student measures the time taken, t seconds, to complete a chemical reaction.
The table shows the results.

Reaction time, t seconds	$20 < t \leqslant 30$	$30 < t \leqslant 35$	$35 < t \leqslant 40$	$40 < t \leqslant 50$
Frequency	2	18	7	3

(a) Calculate an estimate of the mean reaction time.

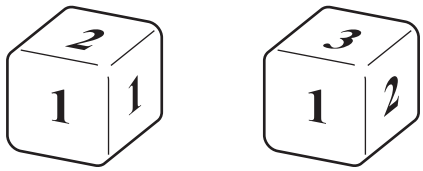
Answer(a) ..... s [2]

(b) On the grid, draw a histogram to show the information in the table.



[3]

13



X *Y*

The diagram shows two fair dice, *X* and *Y*, each with 6 faces.

The numbers on *X* are 1, 1, 1, 1, 2 and 3.
The numbers on *Y* are 1, 1, 1, 2, 3 and 3.

(a) *X* is rolled.

Write down the probability that the number on the top face is

(i) odd,

Answer(a)(i) ..... [1]

(ii) not 1.

Answer(a)(ii) ..... [1]

(b) The two dice are rolled and the numbers on the top faces are noted.

Find the probability that

(i) both numbers are 1,

Answer(b)(i) ..... [2]

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(ii) at least one of the numbers is 1,

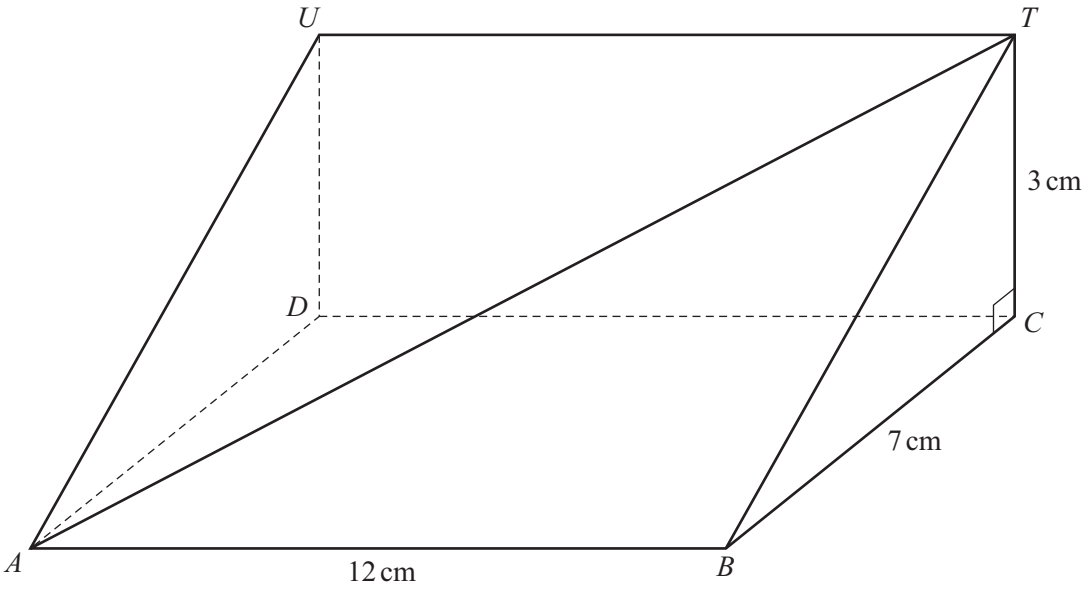
Answer(b)(ii) ..... [3]

(iii) the product of the two numbers is even.

Answer(b)(iii) ..... [2]

Question 14 is printed on the next page.

14



NOT TO SCALE

The diagram shows a prism of length 12 cm.
Triangle BCT is a cross-section of the prism.
Angle $BCT = 90°$, $BC = 7$ cm and $CT = 3$ cm.
$ABCD$ is horizontal.

(a) Calculate the angle between the planes $ABTU$ and $ABCD$.

Answer(a) ..... [2]

(b) Calculate AT.

Answer(b) ..... cm [3]

(c) Calculate the angle of elevation of T from A.

Answer(c) ..... [2]

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