Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

0256820332

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/31**

Paper 3 (Core) **October/November 2015**

1 hour 45 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 96.

This document consists of **16** printed 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)** Complete the list of factors of 18.

Answer(a) 1, ... , ... , ... , ... , 18 [1]

(b) Work out.

(i) $\sqrt{676}$

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

(ii) 6.7^3

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

(iii) $\dfrac{63.5 - 26.1}{2.93}$

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

(c) Write 807.536 correct to

(i) 2 decimal places,

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

(ii) 4 significant figures,

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

(iii) the nearest 10,

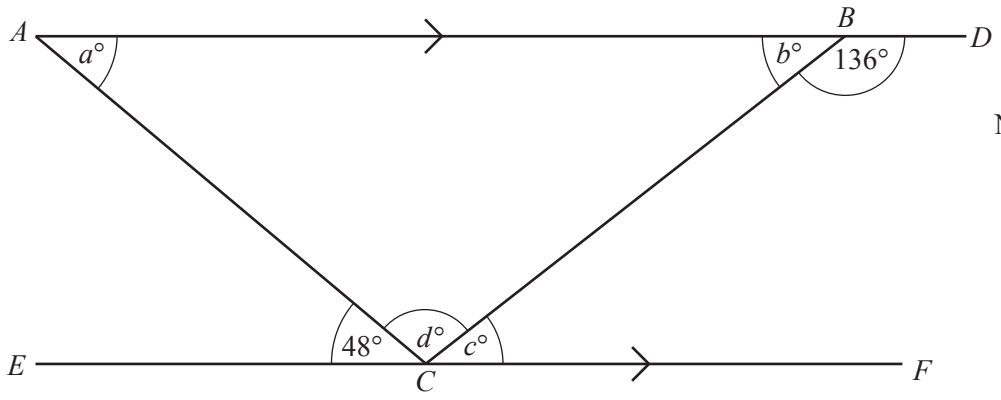
Answer(c)(iii) ..... [1]

(iv) the nearest 100.

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

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2



NOT TO SCALE

ABD and *ECF* are parallel straight lines.

Find the values of *a*, *b*, *c* and *d*.

Answer a = ...

b = ...

c = ...

d = ... [4]

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3 **(a)** Tejas, Wali and Niamh share 100 pieces of candy in the ratio 5 : 9 : 11.

Find how many pieces of candy Wali receives.

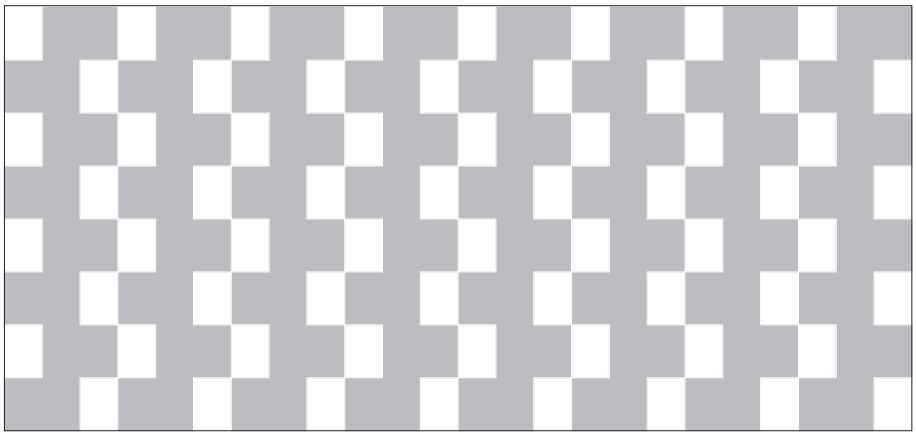
Answer(a) ..... [2]

(b) Hanneke buys a gold necklace for $ 4500.
She later sells it for $ 5300.

Calculate her percentage profit.

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

4



NOT TO SCALE

A rectangular patio is 6 metres long and 3.2 metres wide.
It is made up of 8 rows of grey tiles and white tiles as shown in the diagram.

(a) Calculate

(i) the area of the patio,

Answer(a)(i) ..... m^2 [1]

(ii) the perimeter of the patio.

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

(b) All tiles have the same width.
Each grey tile is twice as long as a white tile.

Complete this statement.

A grey tile has length ..... metres and width ..... metres. [2]

(c) Find the total number of white tiles and the total number of grey tiles.

Answer(c) Number of white tiles .....

Number of grey tiles ..... [2]

(d) Each white tile costs \$0.95 and each grey tile costs \$1.35 .

Find the total cost of the tiles used to make the patio.

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

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5 Romina opens 10 packets of biscuits and counts the number of biscuits in each packet.
The number of biscuits in each packet is shown below.

23 24 23 22 25 23 24 25 26 21

(a) Find

(i) the range,

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

(ii) the mode,

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

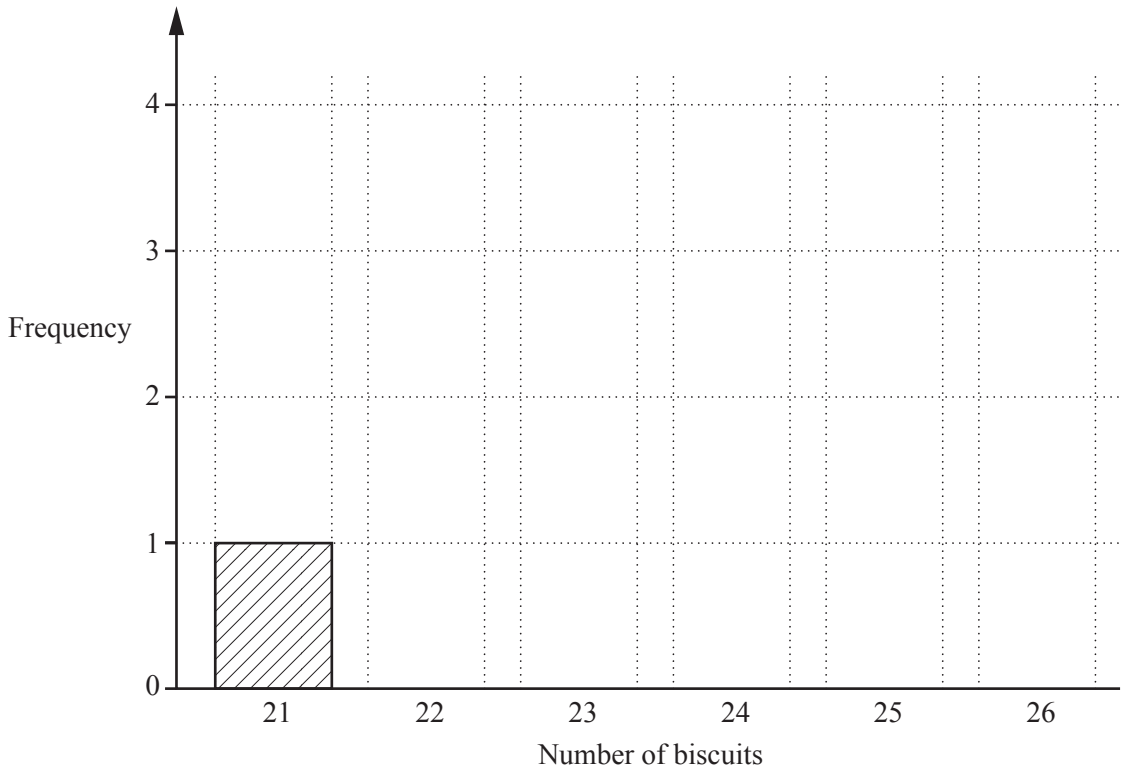
(iii) the median,

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

(iv) the mean.

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

(b) Complete the bar chart.
The first bar has been drawn for you.



[2]

6 Each person at a school Science Fair receives a lunchbox.
There are 50 students, 7 teachers, 9 judges and 84 parents at the Science Fair.

(a) Find the total number of people at the Science Fair.

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

(b) Each lunchbox contains two sandwiches.

Find the total number of sandwiches in all the lunchboxes.

Answer(b) ..... [1]

(c) Paul's Snacks make the lunchboxes.
The lunchbox contains two sandwiches, one piece of fruit and one bottle of water.

The cost of making each lunchbox is $4.25 .
Each sandwich costs $1.45 and the bottle of water costs $0.70 .

Find the cost of the piece of fruit.

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

(d) The school pays Paul's Snacks $5 for each lunchbox.

Find how much profit Paul's Snacks make on each lunchbox.

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

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7 A taxi company charges a fixed amount of $\$F$ for each journey.
It also charges \$2 for each kilometre of the journey.

A taxi journey is M km.

(a) Find an expression, in terms of F and M, for the total cost of this journey.

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

(b) When $F = 3$ find the total cost of a journey of 6 km.

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

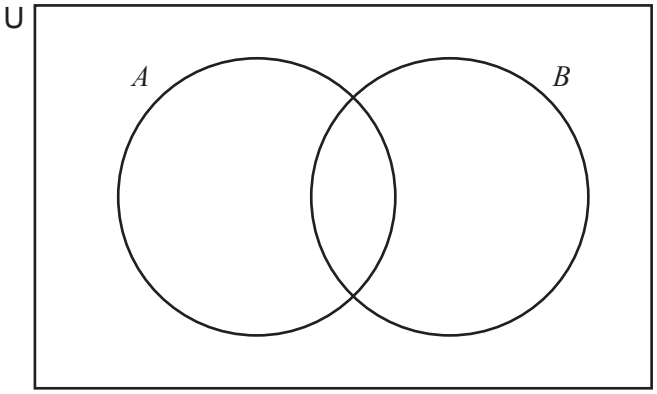
(c) Find the distance travelled when $F = 3$ and the total cost of the journey is \$21.

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

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[Turn over

8 $\mathsf{U} = \{1,2,3,4,5,6,7,8,9,10\}$
$A = \{1,3,5,6,7,8\}$
$B = \{1,3,4,7,9\}$



(a) Write the elements of U in the correct places in the Venn diagram. [2]

(b) Write down the elements in the set

(i) $A \cap B$,

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

(ii) $(A \cup B)'$,

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

(iii) $A' \cap B$.

Answer(b)(iii) ..... [1]

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(c) A number is chosen at random from the set {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}.

Find the probability that it is

(i) an odd number,

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

(ii) a number less than 4,

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

(iii) a triangle number.

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

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9 These are the first five terms of a sequence.

−2 1 6 13 22

(a) Write down the next two terms in this sequence.

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

(b) Find an expression for the nth term.

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

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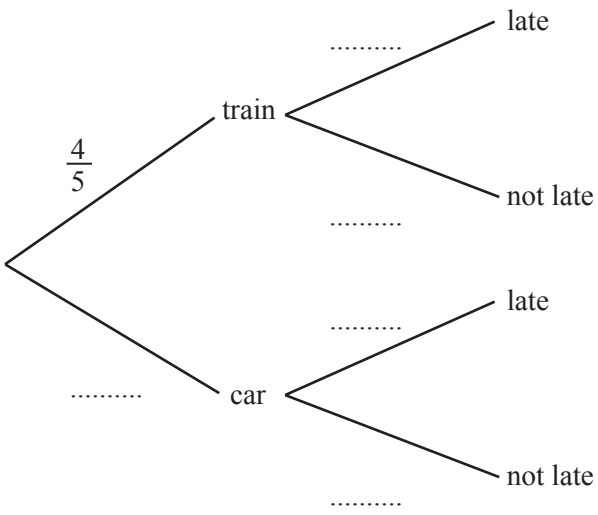
10 Kensuke travels to school either by train or by car.

The probability that he travels by train is $\frac{4}{5}$.

If Kensuke travels by train then the probability that he is late for school is $\frac{1}{20}$.

If Kensuke travels by car then the probability that he is late for school is $\frac{1}{15}$.

(a) Complete the tree diagram.



[3]

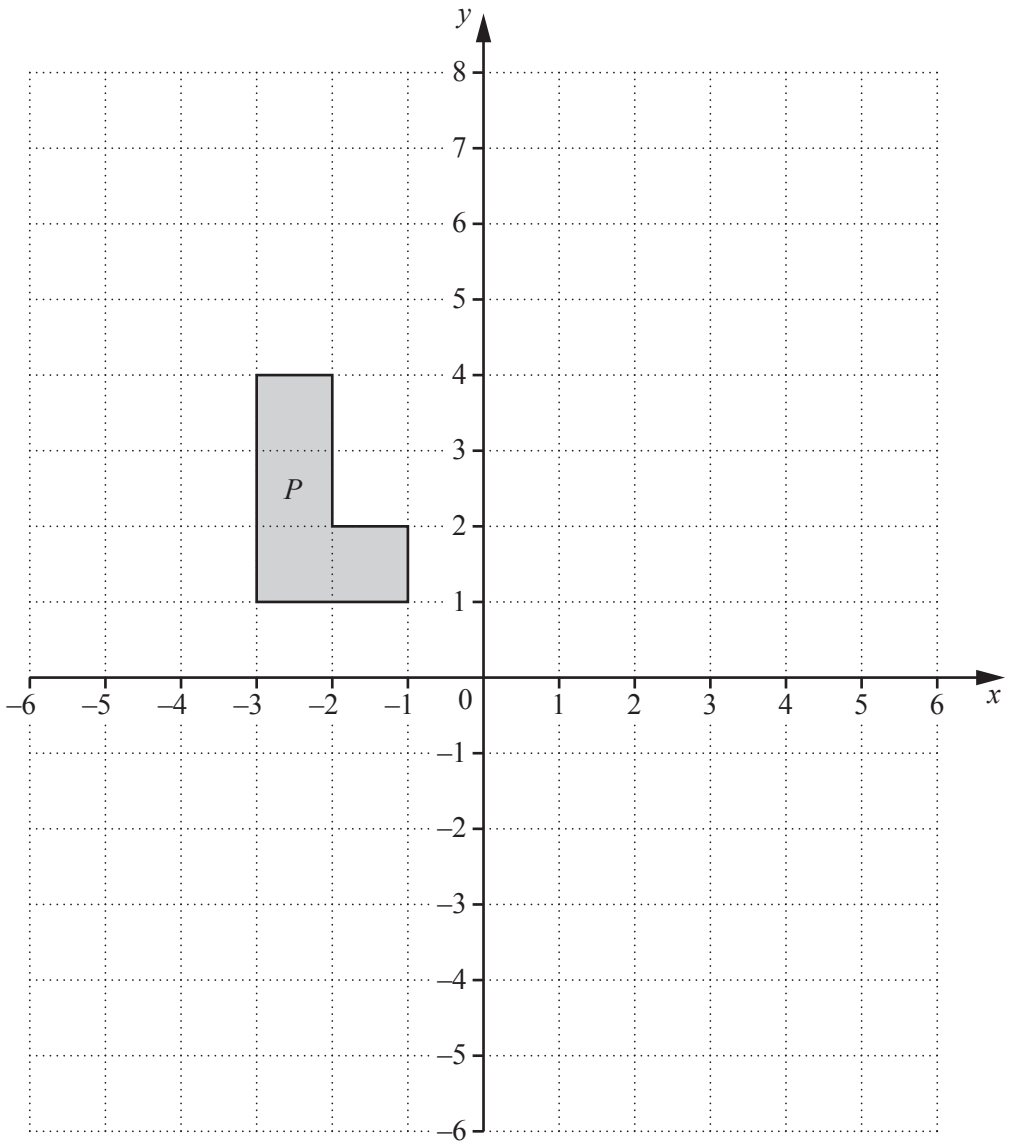
(b) Find the probability that Kensuke travels by train and is late for school.

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

(c) Find the probability that Kensuke is not late for school.

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

11



(a) Reflect shape P in the line $x = 1$. Label the image A. [2]

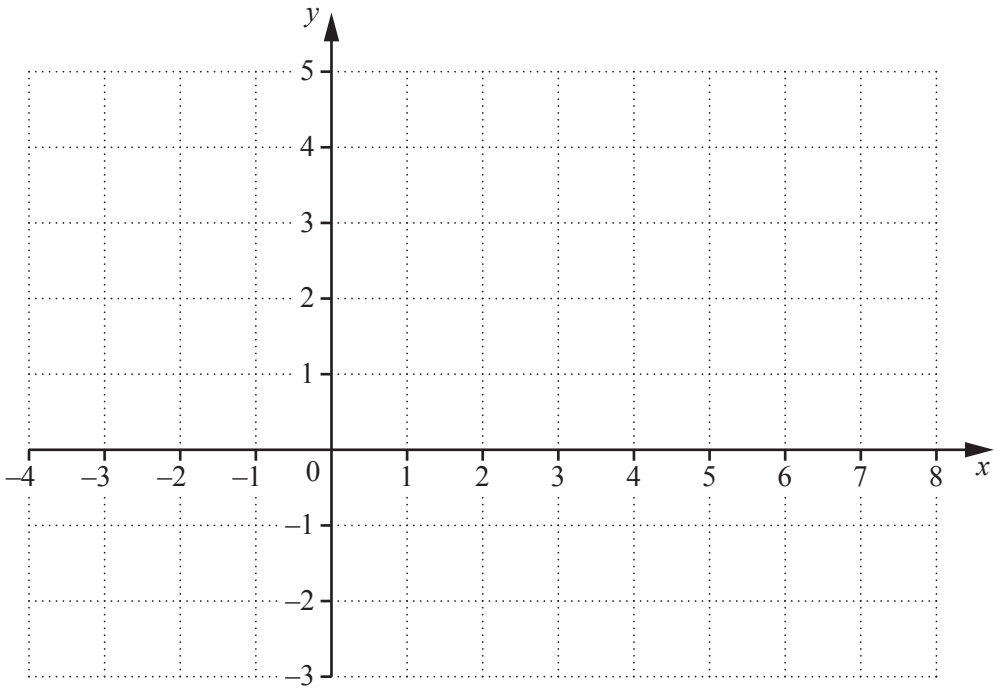
(b) Translate shape P by the vector $\begin{pmatrix} -2 \\ -3 \end{pmatrix}$. Label the image B. [2]

(c) Rotate shape P by 180° about the point (0, 0). Label the image C. [2]

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[Turn over

12



The axes are drawn on a 1 cm^2 grid.
A is the point (2, 3) and B is the point (8, −3).

(a) Plot the points A and B on the grid. [2]

(b) Find the co-ordinates of the midpoint of AB.

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

(c) Calculate the length of AB.
Give your answer correct to 2 decimal places.

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

(d) Find the gradient of AB.

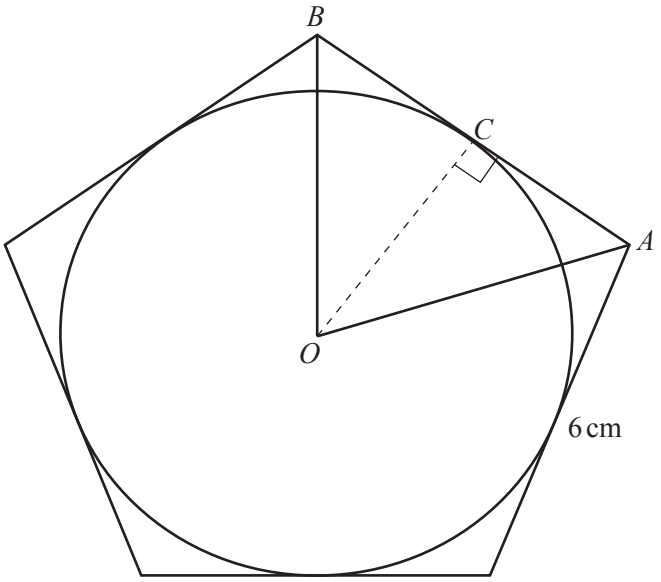
Answer(d) ..... [2]

(e) Find the equation of the straight line that passes through point A and point B.

Answer(e) ..... [2]

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13



NOT TO SCALE

A circle, centre O, is inscribed in a regular pentagon.
Each side of the pentagon has length 6 cm.

(a) Find angle AOB.

Answer(a) Angle AOB = ... [1]

(b) Find the size of an interior angle of the regular pentagon.

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

(c) Use trigonometry to find the radius, OC, of the circle.

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

(d) Find the area of the pentagon.

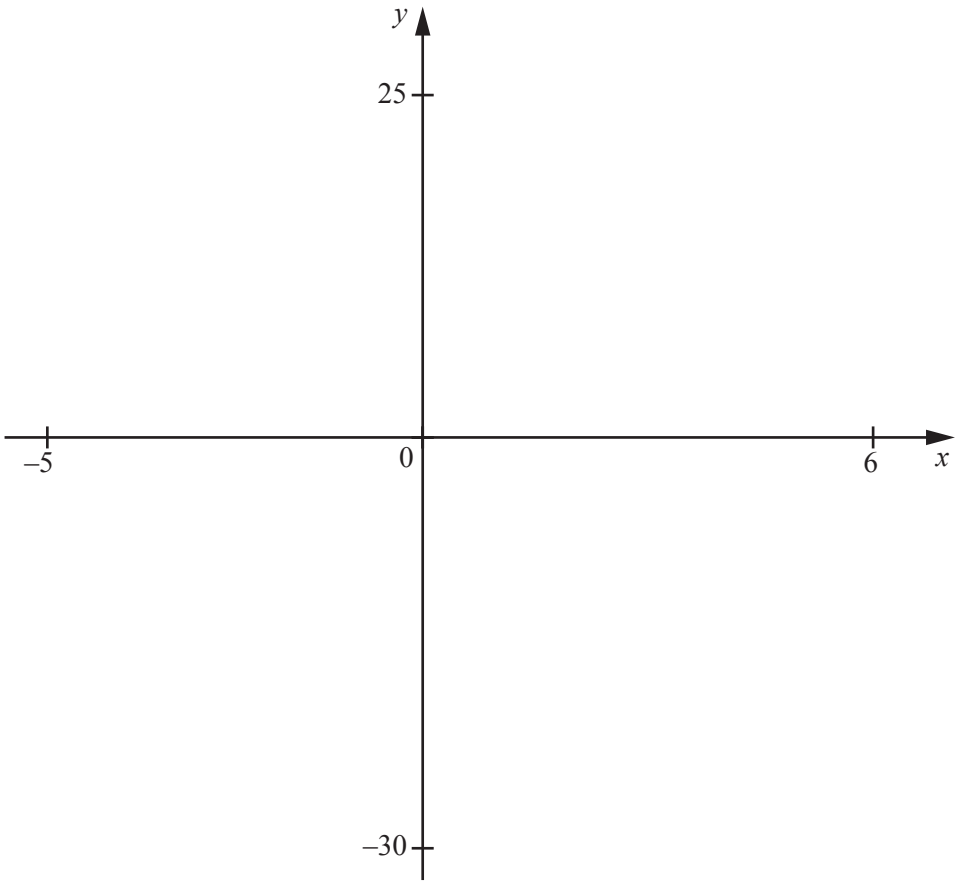
Answer(d) ..... cm^2 [3]

Question 14 is printed on the next page.

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[Turn over

14



$f(x) = 0.5x^3 - x^2 - 9.5x + 10$

(a) On the diagram, sketch the graph of $y = f(x)$ for $-5 \leqslant x \leqslant 6$. [2]

(b) Find the co-ordinates of

(i) the points where the curve crosses the x-axis,

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

(ii) the point where the curve crosses the y-axis,

Answer(b)(ii) (..... , ...) [1]

(iii) the local minimum point.

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

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