OCR
RECOGNISING ACHIEVEMENT

M10

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS C (GRADUATED ASSESSMENT) B280B

MODULE M10 – SECTION B

Candidates answer on the Question Paper

OCR Supplied Materials:
None

Other Materials Required:
- Geometrical instruments
- Tracing paper (optional)
- Scientific or graphical calculator

Thursday 21 January 2010
Afternoon

Duration: 30 minutes

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

MODIFIED LANGUAGE

INSTRUCTIONS TO CANDIDATES

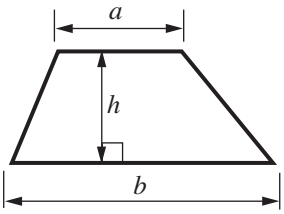
- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Show your working. Marks may be given for a correct method even if the answer is incorrect.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

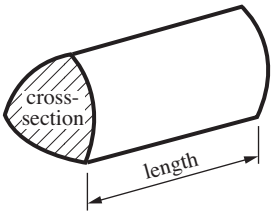
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- Section B starts with question 8.
- You are expected to use a calculator in Section B of this paper.
- Use the π button on your calculator or take π to be 3·142 unless the question says otherwise.
- The total number of marks for this Section is **25**.
- This document consists of **8** pages. Any blank pages are indicated.

Formulae Sheet

Area of trapezium = $\frac{1}{2}(a + b)h$



Volume of prism = (area of cross-section) × length

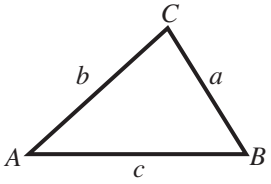


In any triangle *ABC*

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

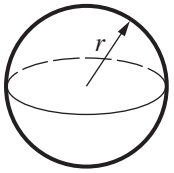
Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

Area of triangle = $\frac{1}{2}ab\sin C$



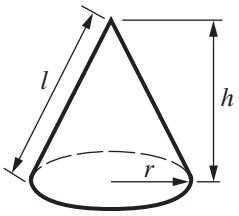
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$



Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

PLEASE DO NOT WRITE ON THIS PAGE

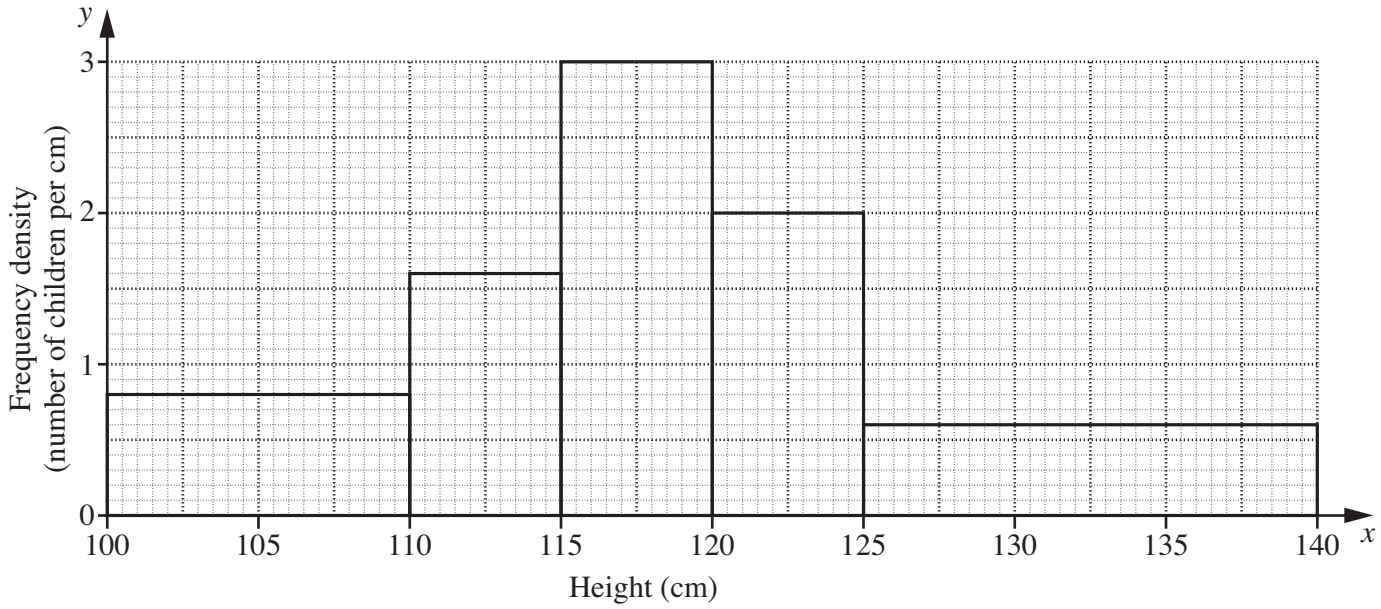
8 The population, P, of an island t years after 2005 is given by this formula.

$$P = 8200 \times 0{\cdot}98^t$$

Using trial and improvement, or otherwise, find the year in which the population will first be less than 7000.
Show your method clearly.

..... **[3]**

9 This histogram shows the distribution of the heights of a group of 50 children.



The group visits a theme park.
For one of the rides a child must be at least 1·2 m tall.

What percentage of the children will be able to go on the ride?

..... **[3]**

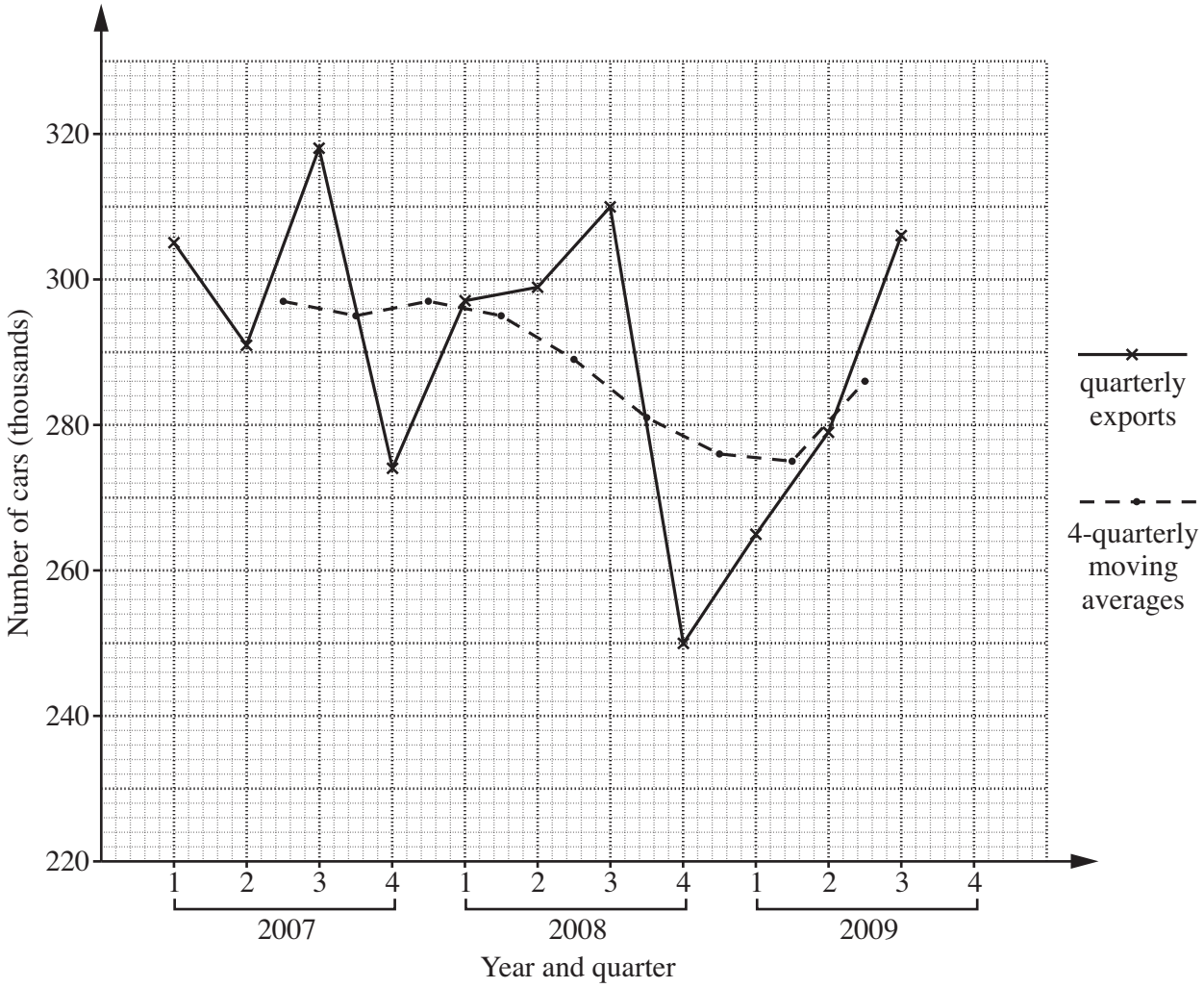
10 **(a)** By completing the square, express $x^2 + 12x - 10$ in the form $(x + a)^2 + b$.

(a) ..... **[3]**

(b) Hence state the minimum value of $x^2 + 12x - 10$.

(b) ..... **[1]**

11 The graph shows the number of cars exported from a country each quarter for eleven quarters during 2007 to 2009, and the 4-quarter moving averages.



(a) Give one advantage of using a moving average.

.....

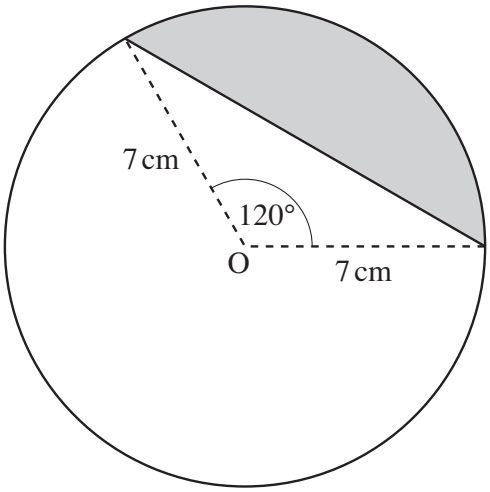
..... **[1]**

(b) The number of cars exported for the fourth quarter of 2009 has not been plotted.

Using the last moving average, calculate the number of cars exported for the fourth quarter of 2009.
Show your working.

(b) ..... thousands **[2]**

12 Calculate the area of the shaded segment.



.....cm^2 **[6]**

TURN OVER FOR QUESTION 13

13 Solve algebraically these simultaneous equations.

$$x^2 + y^2 = 17$$

$$y = x + 3$$

$x =$ ..... $y =$ .....

$x =$ ..... $y =$ ..... **[6]**