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Centre Number						Candidate Number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

**B280B**

**MATHEMATICS C  
(GRADUATED ASSESSMENT)**

**MODULE M10 – SECTION B**

**THURSDAY 21 JANUARY 2010: Afternoon**

**DURATION: 30 minutes**

**SUITABLE FOR VISUALLY IMPAIRED CANDIDATES**

**Candidates answer on the Question Paper**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**Geometrical instruments**

**Tracing paper (optional)**

**Scientific or graphical calculator**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.
- 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.
- 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  $\pi$  button on your calculator or take  $\pi$  to be 3.142 unless the question says otherwise.
- The total number of marks for this Section is 25.



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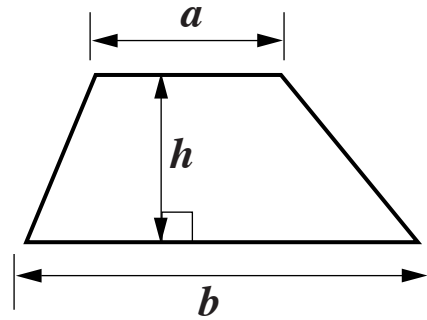
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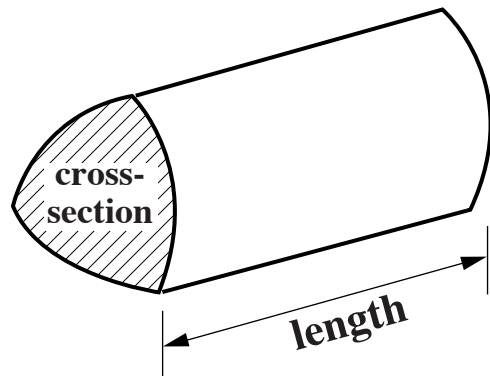
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## FORMULAE SHEET

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



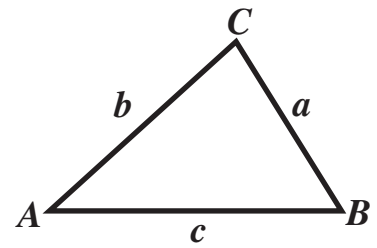
Volume of prism =  
(area of cross-section)  $\times$  length



In any triangle  $ABC$

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

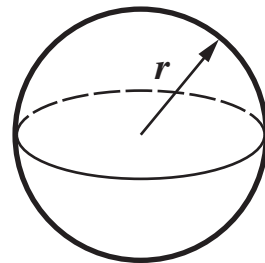
Cosine rule  $a^2 = b^2 + c^2 - 2bc \cos A$



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

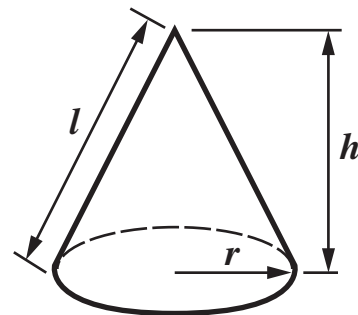
Volume of sphere =  $\frac{4}{3}\pi r^3$

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



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

Curved surface area of cone =  $\pi r l$



**The Quadratic Equation**

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

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

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

$$P = 8200 \times 0.98^t$$

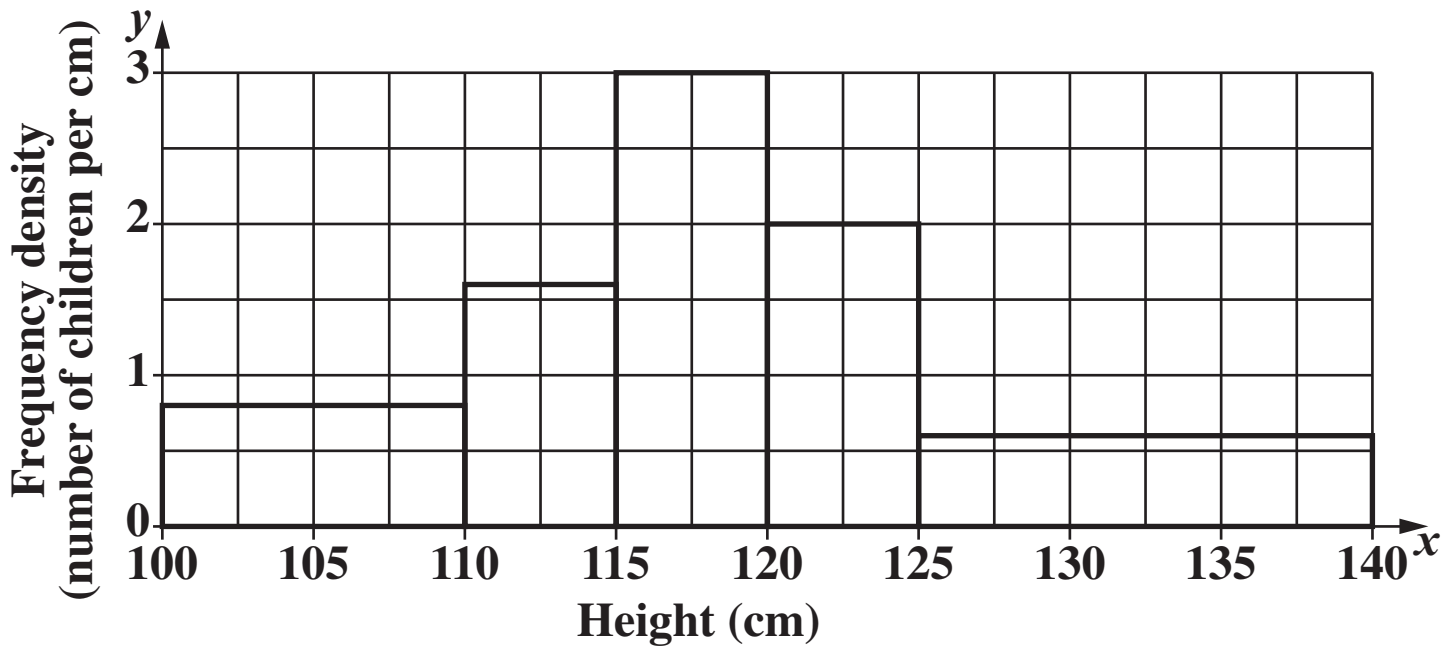
Using trial and improvement, or otherwise, find the year in which the population will first be less than 7000.

Show your method clearly.

[3 marks]

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



**The group visits a theme park.**

**One of the rides has a minimum height restriction of 1.2 m.**

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

**[3 marks]**

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

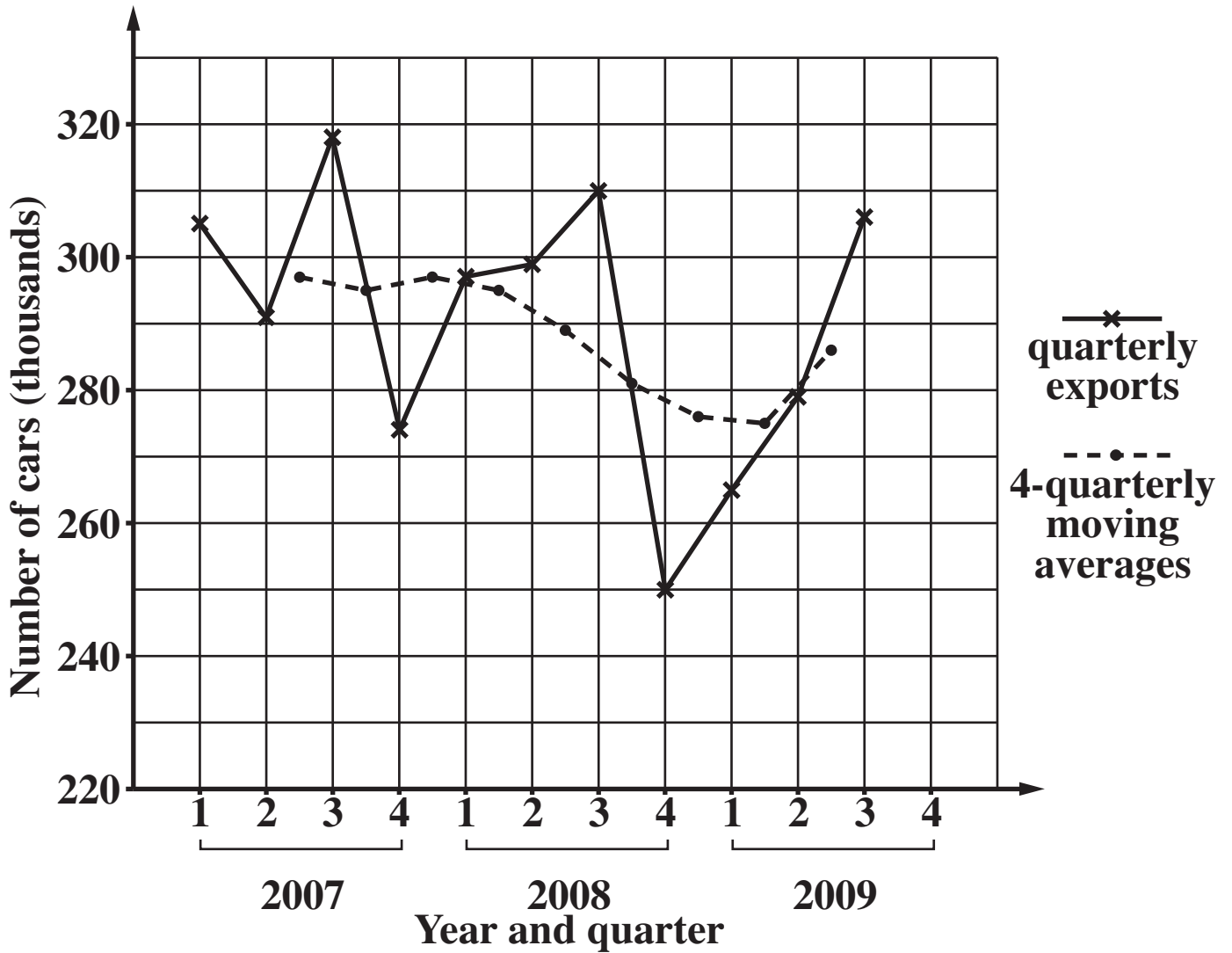
**(a)** \_\_\_\_\_

- (b) Hence state the minimum value of  $x^2 + 12x - 10$ .**  
**[1 mark]**

**(b)** \_\_\_\_\_



**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 mark]**

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

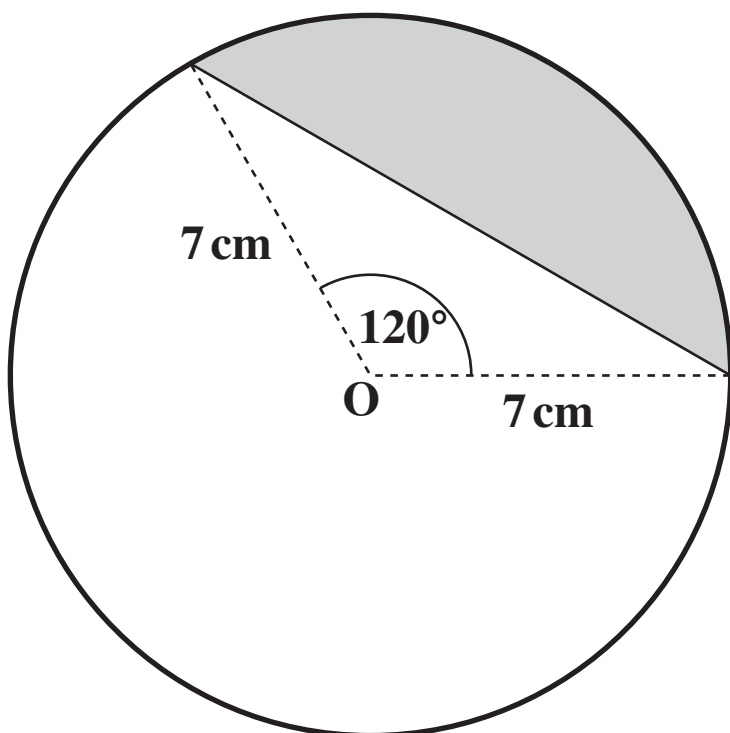
**Using the last moving average, calculate the number of cars exported for the fourth quarter of 2009.**

**Show your working.**

**[2 marks]**

**(b) \_\_\_\_\_ thousands**

**12 Calculate the area of the shaded segment.  
[6 marks]**



\_\_\_\_\_  $\text{cm}^2$

**TURN OVER FOR QUESTION 13**

**13 Solve algebraically these simultaneous equations.**

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

$$y = x + 3$$

**[6 marks]**

$$x = \underline{\hspace{2cm}} \quad y = \underline{\hspace{2cm}}$$

$$x = \underline{\hspace{2cm}} \quad y = \underline{\hspace{2cm}}$$