OCR
RECOGNISING ACHIEVEMENT

M8

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS C (GRADUATED ASSESSMENT)
MODULE M8 – SECTION B

B278B

Monday 9 March 2009
Morning

Duration: 30 minutes
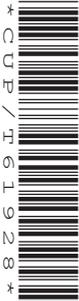
Candidate Forename		Candidate Surname	

Centre Number					Candidate Number				

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 7.
• 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.

FOR EXAMINER'S USE

SECTION B	

Turn over

Formulae Sheet

Volume of prism = (area of cross-section) × length
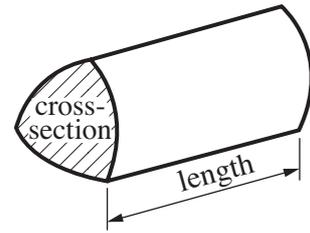
In any triangle ABC

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

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

**Area of triangle** = $\frac{1}{2} ab \sin C$
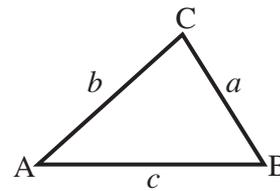
Volume of sphere = $\frac{4}{3} \pi r^3$

Surface area of sphere = $4\pi r^2$
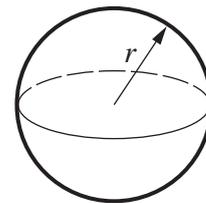
Volume of cone = $\frac{1}{3} \pi r^2 h$

Curved surface area of cone = $\pi r l$
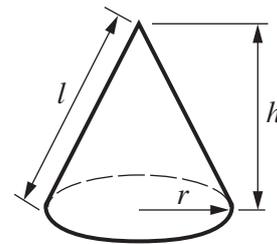
The Quadratic Equation

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

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

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7 **(a)** Solve.

$$3x = 4 + \frac{x}{2}$$

(a) ....**[2]**

(b) Rearrange these formulae to make x the subject.

    (i) $3x + y = 5x$

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

    (ii) $y = \frac{x^2}{9}$

(ii) ....**[2]**

Turn over

8   The population of Pavham on 1 January 2009 was 12 667.
This was an increase of 6% on the population on 1 January 2008.

    (a) Calculate the population on 1 January 2008.

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

    (b) It is assumed that the population will continue to increase by 6% a year.

        (i)   Explain why $12\,667 \times 1{\cdot}06^2$ gives the expected population on 1 January 2011.

            ....

            .... **[2]**

        (ii) Calculate this expected population.

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

9   Bately (B) is 8·6 km from Pavham (P) on a bearing of 105°.

N

Not to scale

P 105°

8·6 km

x → B
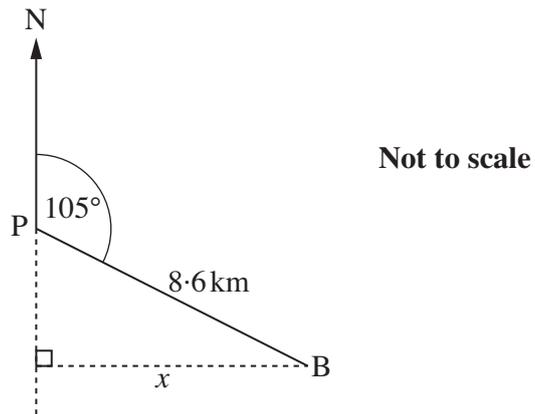
Calculate x, the distance that Bately is East of Pavham.
Give your answer to an appropriate degree of accuracy.

....................................km **[4]**

10 This cumulative frequency graph represents the distribution of the heights of the girls in year 6 of Fairacres School.
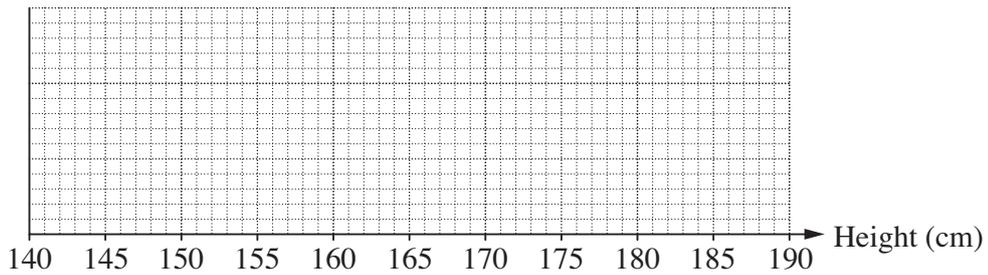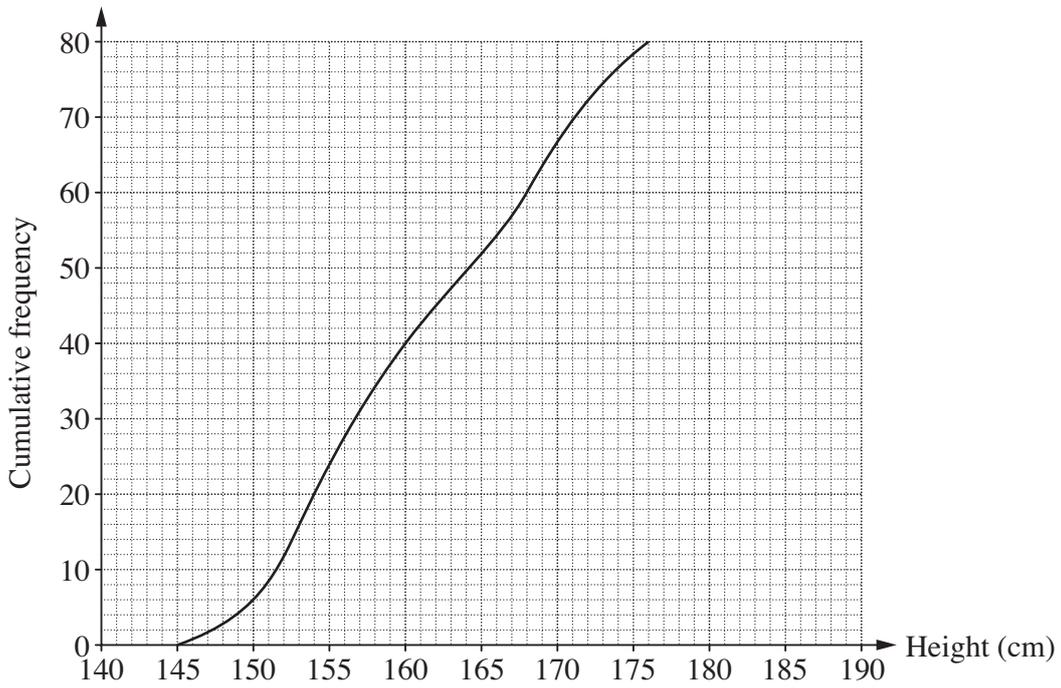
(a) On the grid above, construct a box plot to represent this distribution. **[3]**

(b) This box plot represents the distribution of the heights of the boys in year 6.
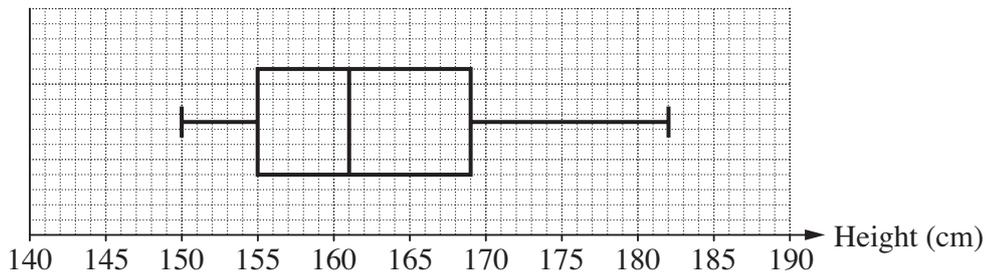
Compare the average and spread of the two distributions.
Support your answers with numerical evidence.

....

....

.... **[3]**

11 This table shows a family's use of electricity from 2005 to 2008.
The figures in the table show the numbers of units used each quarter.

Year	2005				2006			
Quarter	1	2	3	4	1	2	3	4
Units used	2006	1091	854	1527	2053	1578	786	1395

Year	2007				2008			
Quarter	1	2	3	4	1	2	3	4
Units used	1831	1492	703	1416	1642	1106	726	1128

The information has been plotted on this graph, together with the 4-point moving averages.
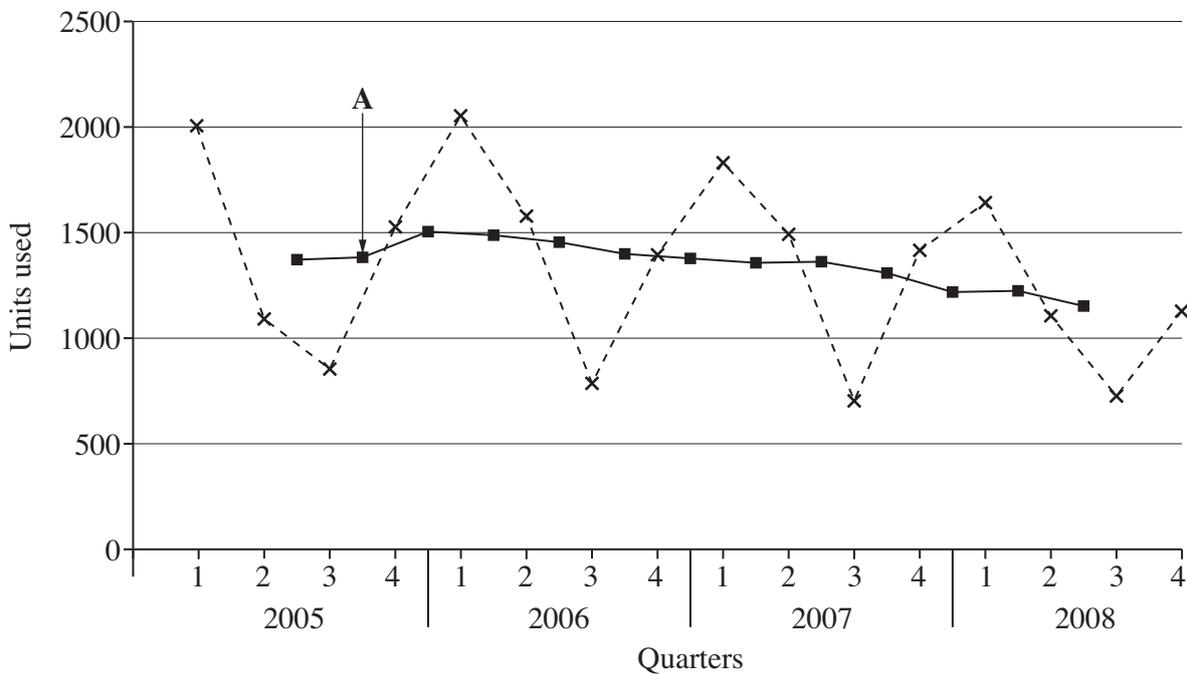
(a) Calculate the moving average labelled **A**.

(a) .... units **[2]**

(b) What do the moving averages on this graph show about the family's use of electricity during these years?

....

.... **[1]**

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