OCR
RECOGNISING ACHIEVEMENT

# B278B

**GENERAL CERTIFICATE OF SECONDARY EDUCATION**
**MATHEMATICS C (GRADUATED ASSESSMENT)**
MODULE M8 – SECTION B

# M8

**TUESDAY 11 MARCH 2008**

Morning
Time: 30 minutes

Candidates answer on the question paper
**Additional materials (enclosed):** None

**Additional materials (required):**
Geometrical instruments
Tracing paper (optional)
Scientific or graphical calculator

*CUP/T57752*

| Candidate Forename | | Candidate Surname | |
|---|---|---|---|
| Centre Number | | Candidate Number | |

**INSTRUCTIONS TO CANDIDATES**

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or 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.

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this Section is **25**.
- Section B starts with question 9.
- 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.

| FOR EXAMINER'S USE | |
|---|---|
| SECTION B | |

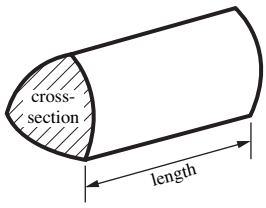
This document consists of **8** printed pages.



**[Turn over**

# Formulae Sheet

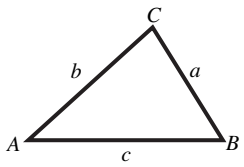
**Volume of prism** = (area of cross-section) × length




**In any triangle** $ABC$

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

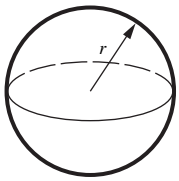
**Cosine rule** $a^2 = b^2 + c^2 - 2bc\cos A$




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

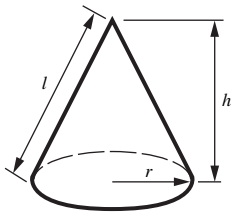
**Volume of sphere** = $\frac{4}{3}\pi r^3$

**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**

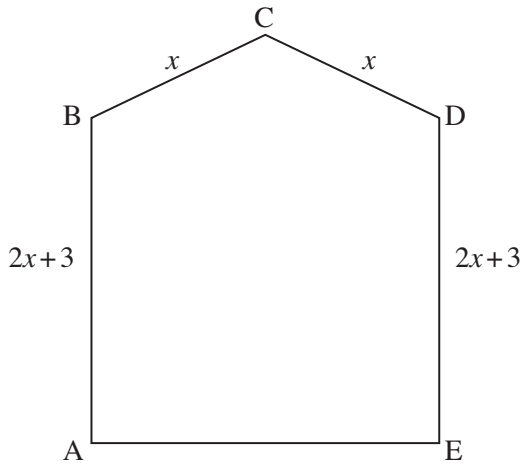
The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

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

**PLEASE DO NOT WRITE ON THIS PAGE**

**9** All lengths of this pentagon are in centimetres.

BC = DC = $x$
AB = ED = $2x + 3$




**Not to scale**

The perimeter, $P$, of the pentagon is given by the formula $P = 7x + 8$.

**(a)** Write down an expression for the length AE.

**(a)** ..... [1]

**(b)** Make $x$ the subject of the formula $P = 7x + 8$.

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

**10** In a clearance sale, prices are reduced by 60%.
The sale price of a sofa is £340.

Work out the original price of the sofa.

£ ..... [3]

**11** **(a)** Complete this factorisation.

$$x^2 - x - 6 = (x + 2)(.....)$$ [1]

**(b)** Hence solve.

$$x^2 - x - 6 = 0$$

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

**12** Solve this inequality.

$$9x < 4x + 10$$

..... [2]

**13** At the start of 2006 the population of a town was 127 320.
The population is increasing by 14% each year.

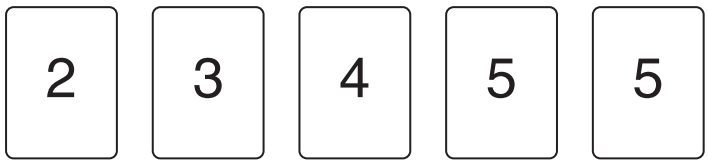
Assuming this growth rate continues, what will the population be at the start of 2010?

..... [3]

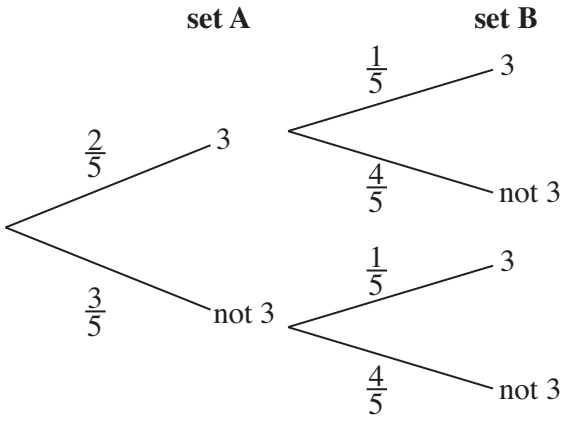
**14** Beth has two sets of cards.

**Set A**


**Set B**




Beth takes a card at random from each of these sets of cards.
This tree diagram shows the probability of getting a 3 from each set.

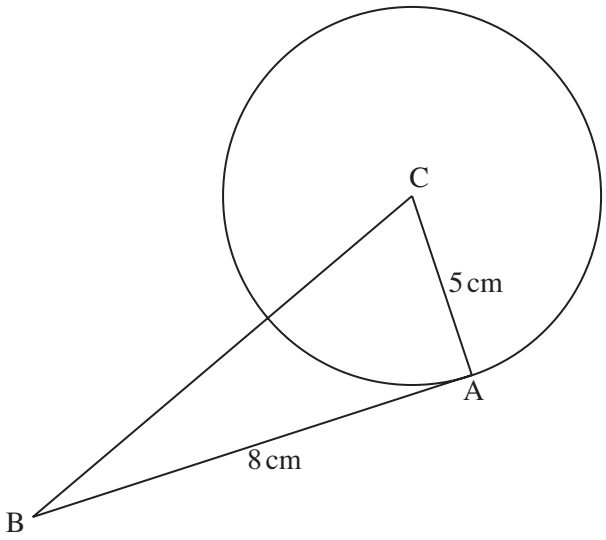



Work out the probability that Beth takes a 3 from set A **and** a 3 from set B.

..... [2]

**15** C is the centre of a circle.
BA is a tangent to the circle.

AC = 5 cm and AB = 8 cm.




**Not to scale**

**(a)** Explain why angle CAB = 90°.

.....

..... [1]

**(b)** Calculate the size of angle CBA.

**(b)** .....° [3]

**(c)** Calculate the length BC.

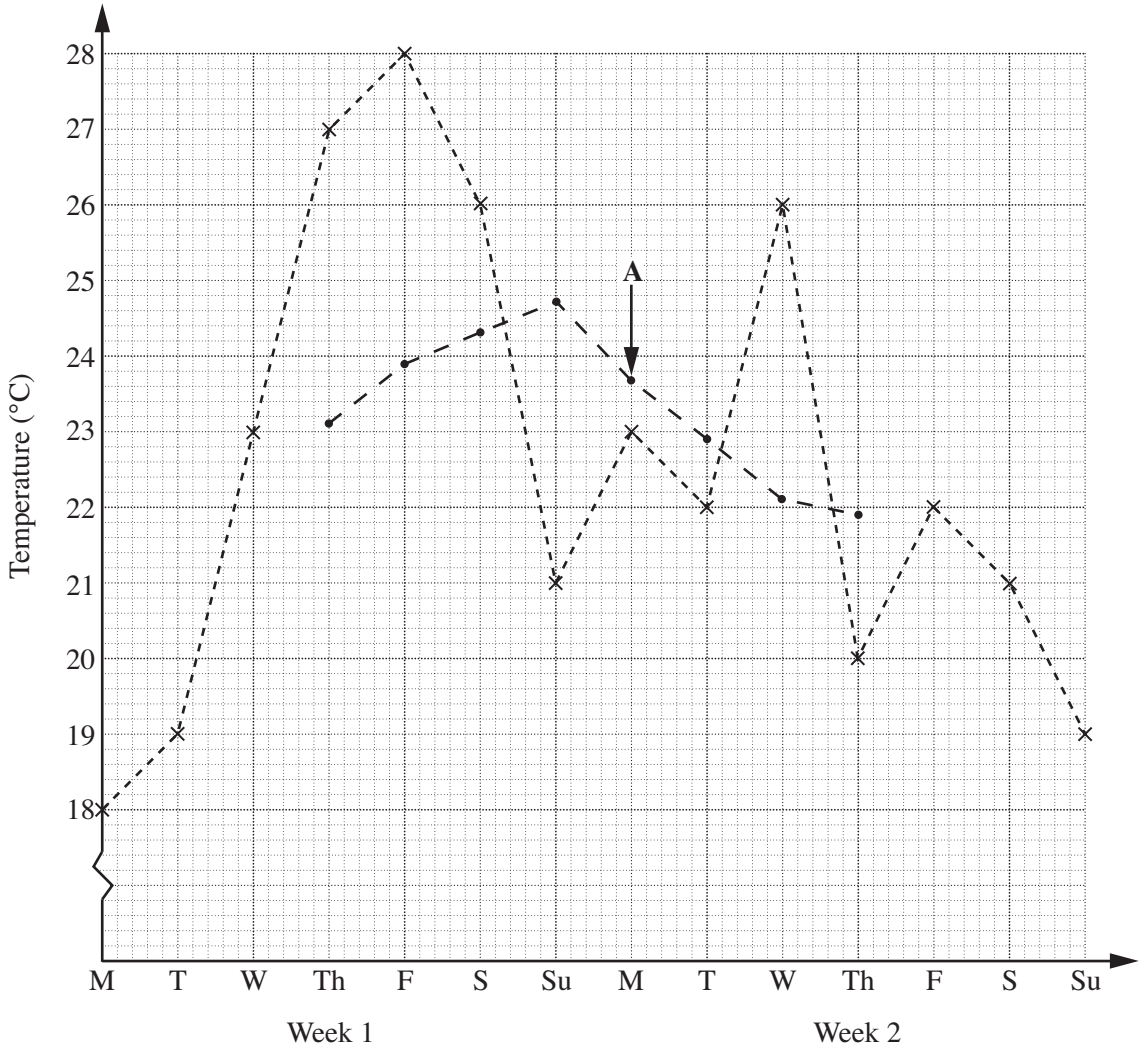
**(c)** .....cm [3]

**TURN OVER FOR QUESTION 16**

**16** This table shows the temperature, in °C, at noon in Portsmouth over a two-week period.

| | M | T | W | Th | F | S | Su |
|---|---|---|---|---|---|---|---|
| Week 1 | 18 | 19 | 23 | 27 | 28 | 26 | 21 |
| Week 2 | 23 | 22 | 26 | 20 | 22 | 21 | 19 |

The temperatures (×) and the 7-day moving averages (•) are shown on this graph.




**Calculate** the moving average labelled **A**.
Show your working.

..... °C [3]