OCR RECOGNISING ACHIEVEMENT

M8

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS C (GRADUATED ASSESSMENT)

B278B

MODULE M8 – SECTION B

Candidates answer on the question paper

OCR Supplied Materials:
None

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

Tuesday 20 January 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	

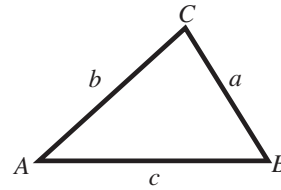OCR is an exempt Charity

Turn over

Formulae Sheet

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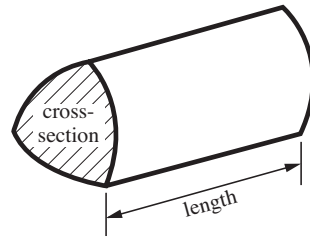
In any triangle *ABC*

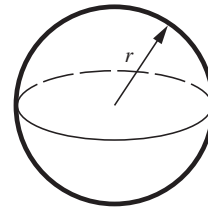**Sine rule** $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$
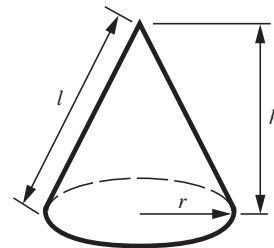
Area of triangle = $\frac{1}{2} ab \sin C$

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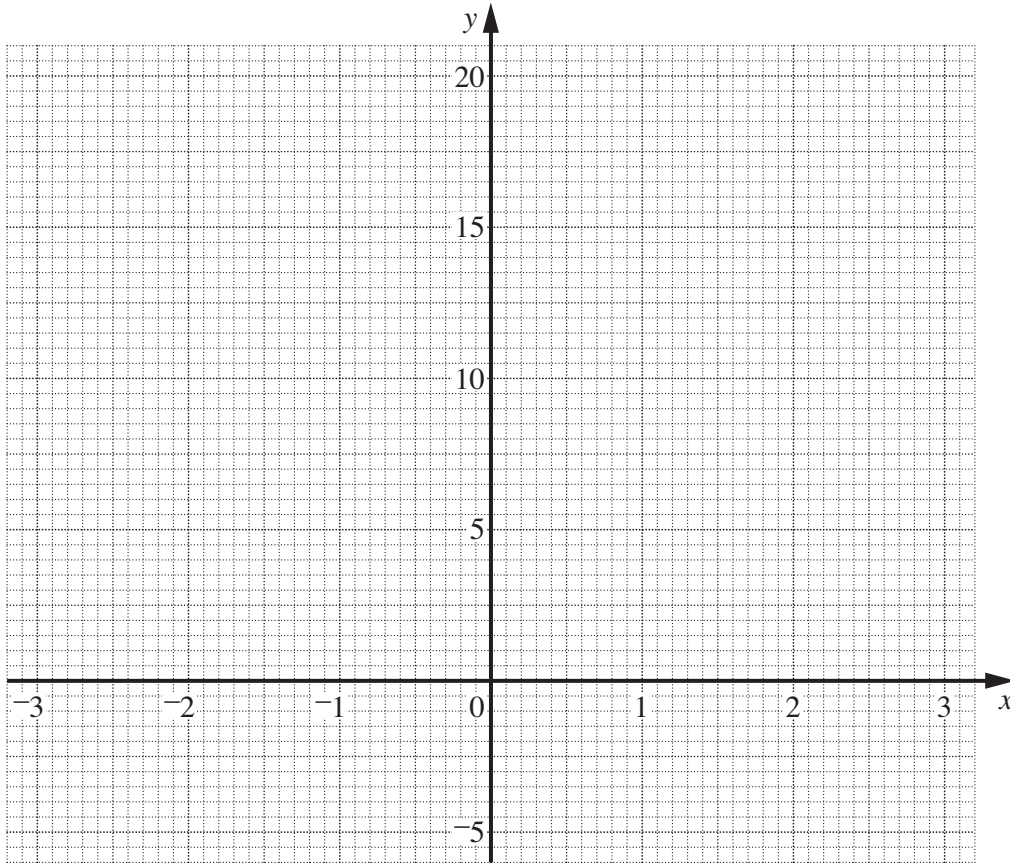
$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

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7   **(a)**   Complete the table of values for $y = 2x^2 - x - 3$.

x	−3	−2	−1	0	1	2	3
y	18	7		−3	−2	3	12

[1]

   (b)   **(i)**   On the axes below, draw the graph of $y = 2x^2 - x - 3$ for values of x from −3 to 3.

[2]

   (ii)   Use your graph to solve this equation.

   $2x^2 - x - 3 = 10$

(b)(ii) .... [2]

Turn over

8 A bag contains 7 blue marbles and 3 white marbles.
Teresa takes a marble at random, notes its colour and replaces it.
She then takes another marble at random.

   (a) Complete the tree diagram.

<u>First marble</u>   <u>Second marble</u>

$\frac{7}{10}$ Blue

$\frac{7}{10}$ Blue

.... White

.... White

$\frac{7}{10}$ Blue

.... White
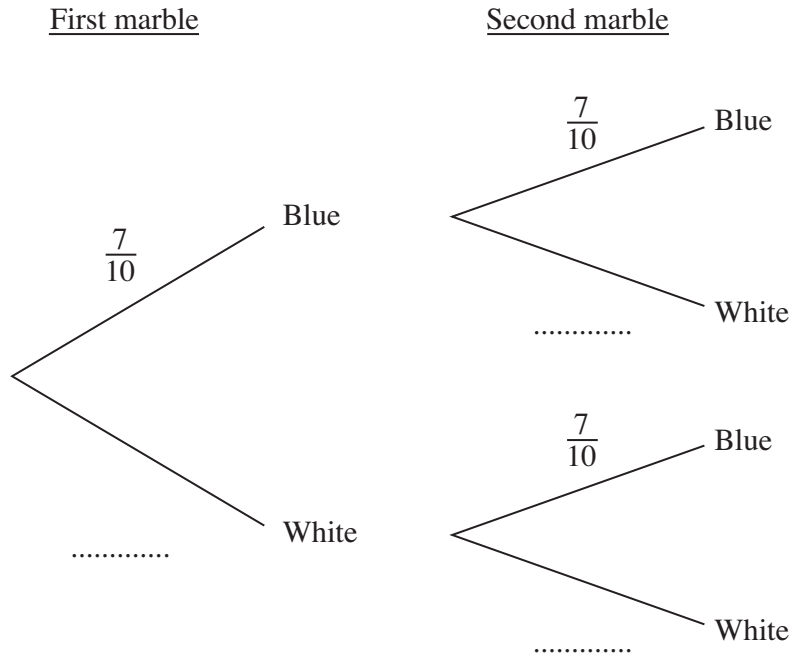
[1]

   (b) What is the probability that Teresa takes one marble of each colour?

   (b) .... **[3]**

9 **(a)** The table lists the average volume of water flowing each second over four waterfalls.

Waterfall	Average volume (litres/second)
Niagara	$6{\cdot}01 \times 10^6$
Celilo	$5{\cdot}42 \times 10^6$
Boyoma	$1{\cdot}70 \times 10^7$
Shoshone	$2{\cdot}83 \times 10^5$

Write these volumes in order, smallest first.

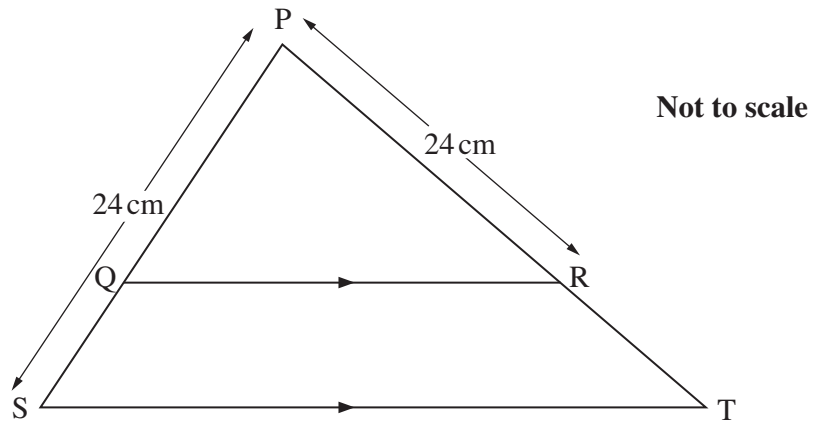....................... ....   **[2]**
smallest

(b) Following a rainstorm, the volume of water flowing over another waterfall increases to $1{\cdot}23 \times 10^6$ litres/second.
This is an increase of 64%.

Calculate the volume of water before the rainstorm.
Give your answer in standard form.

(b) ....litres/second **[3]**

10 In this diagram, QR is parallel to ST.

(a) Explain why the triangles PQR and PST are similar.

....

....

.... **[2]**

(b) PS = 24 cm and PR = 24 cm.
PQ is three times as long as QS.

(i) Work out the length PQ.

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

(ii) Work out the length PT.

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

11
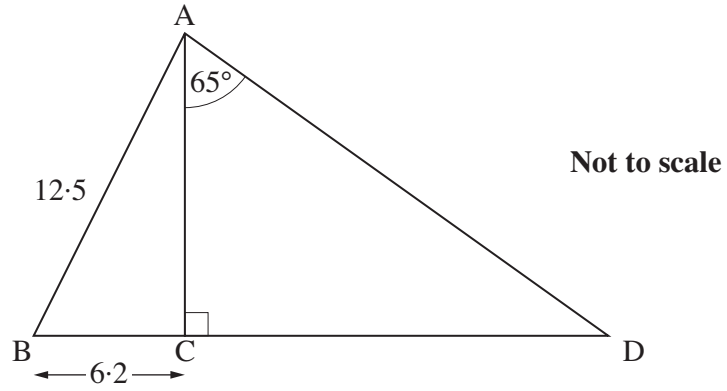
In triangle ABD, AC is perpendicular to BD.
AB = 12·5 cm, BC = 6·2 cm and angle CAD = 65°.

Calculate the length of CD.
Show your method clearly.

.... cm **[6]**

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