M9

OCR
RECOGNISING ACHIEVEMENT

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS C (GRADUATED ASSESSMENT)   **B279B**

MODULE M9 – SECTION B

Candidates answer on the question paper.	**Tuesday 1 March 2011**

Candidates answer on the question paper.

OCR supplied materials:
None

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

**Tuesday 1 March 2011
Morning**

Duration: 30 minutes

Candidate forename		Candidate surname	

| Centre number						Candidate number					

INSTRUCTIONS TO CANDIDATES

*   Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
*   Use black ink. Pencil may be used for graphs and diagrams only.
*   Read each question carefully. Make sure you know what you have to do before starting your answer.
*   Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
*   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.

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.

OCR is an exempt Charity   **Turn over**

Formulae Sheet

Area of trapezium $= \frac{1}{2}(a+b)h$
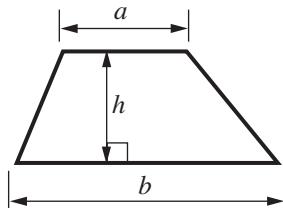
Volume of prism = (area of cross-section) × length
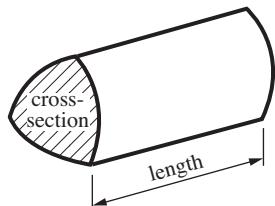
In any triangle ABC

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

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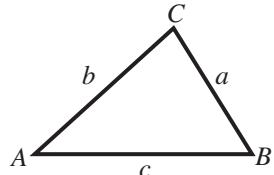
Area of triangle $= \frac{1}{2}ab\sin C$

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

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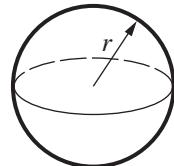
Volume of cone $= \frac{1}{3}\pi r^2 h$

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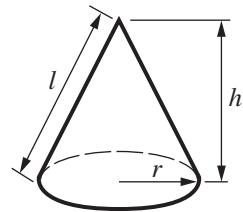
The Quadratic Equation

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

7   The momentum, *I*, of a moving object is given by this formula.

$$I = m \times v$$

- *I* is the momentum in Newton seconds
- *m* is the mass in kilograms
- *v* is the velocity in metres per second

An object has a mass of 8·6 kg and a velocity of 12·8 metres per second.
Both measurements are given correct to one decimal place.

Calculate the **lower bound** of the momentum of the object.

.... Newton seconds **[2]**

Turn over

8

Not to scale
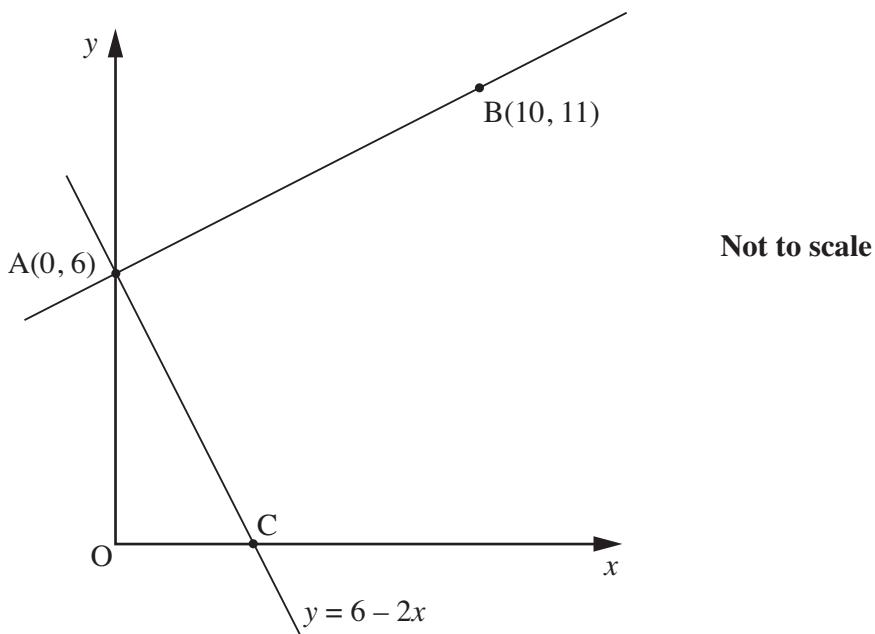
(a) Calculate the length AB.

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

(b) The equation of the line AC is $y = 6 - 2x$.

Show that the line AB is perpendicular to line AC.

....

....

....

.... **[3]**

9

Not to scale
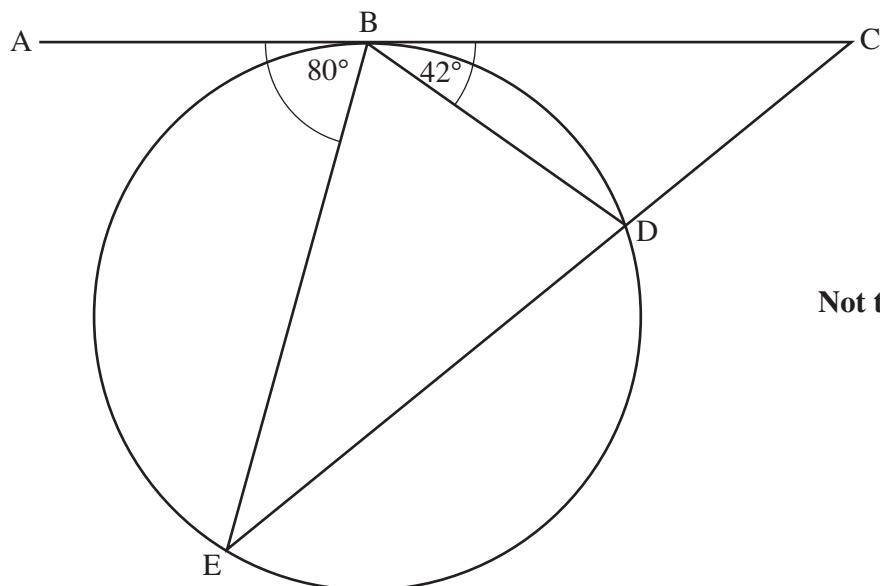
B, D and E are points on a circle.
EDC is a straight line.
ABC is the tangent to the circle at B.
Angle ABE = 80° and angle CBD = 42°.

Find angle BCD.
Give a reason for each step of your answer.

....

....

....

....

.... **[4]**

Turn over

10 The headteacher of a school wants to set up an after-school club for Year 7 students.
He wants to find out whether the way they travel to school will affect their decision to attend.
This table shows how all the students from Year 7 travel to school.

Walk	Bus	Car
68	119	13

He decides to sample the views of 40 students from Year 7 by taking a representative stratified sample.

How many of the students who travel to school by bus should be in the sample?

.... **[2]**

11 The table shows the values of two variables x and y.

x	1·2	2	2·8
y	3·6	10	19·6

(a) Show that y is directly proportional to the square of x.

....

....

....

....

.... **[3]**

(b) Calculate y when $x = 2\cdot4$.

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

12
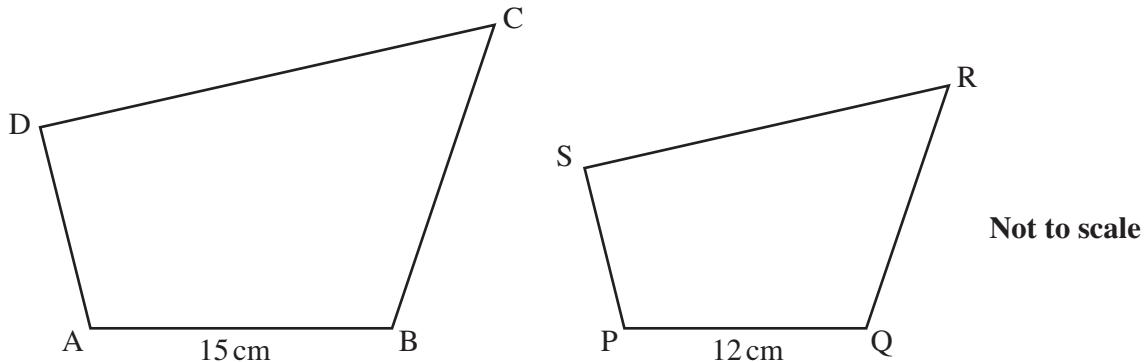
The two quadrilaterals, ABCD and PQRS, are similar.
The area of ABCD is $97 \cdot 5 \, \text{cm}^2$.

Calculate the area of PQRS.

.... cm^2 **[3]**

TURN OVER FOR QUESTION 13

13

O

18

D C

P

A   15   B   12
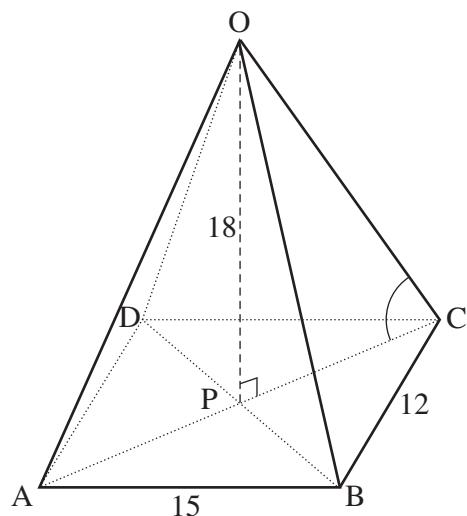
OABCD is a rectangular based pyramid.
The vertex O is vertically above P, the centre of the base.
AB = 15 cm, BC = 12 cm, OP = 18 cm.

Show that angle OCP = 61·9°, correct to one decimal place.   **[4]**