



M9

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS C (GRADUATED ASSESSMENT)
MODULE M9 – SECTION B**

B279B



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	
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Centre number						Candidate number			
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MODIFIED LANGUAGE

INSTRUCTIONS TO CANDIDATES

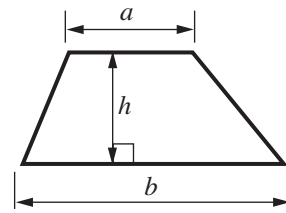
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer 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

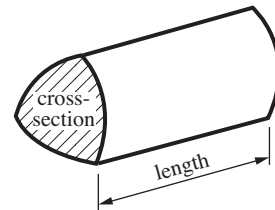
- The number of marks is given in brackets [] at the end of each question or part question.
- Section B starts with question 7.
- You are expected to use a calculator in Section B of this paper.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- The total number of marks for this Section is **25**.
- This document consists of **8** pages. Any blank pages are indicated.

Formulae Sheet

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



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

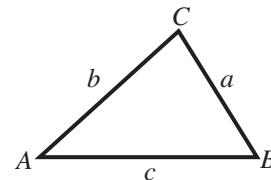


In any triangle ABC

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

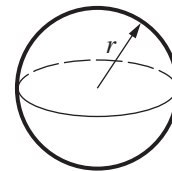
$$\text{Cosine rule} \quad a^2 = b^2 + c^2 - 2bc \cos A$$

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



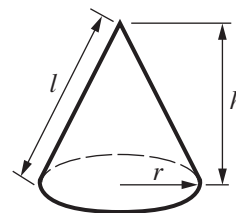
$$\text{Volume of sphere} = \frac{4}{3}\pi r^3$$

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



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

$$\text{Curved surface area of cone} = \pi r l$$



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.

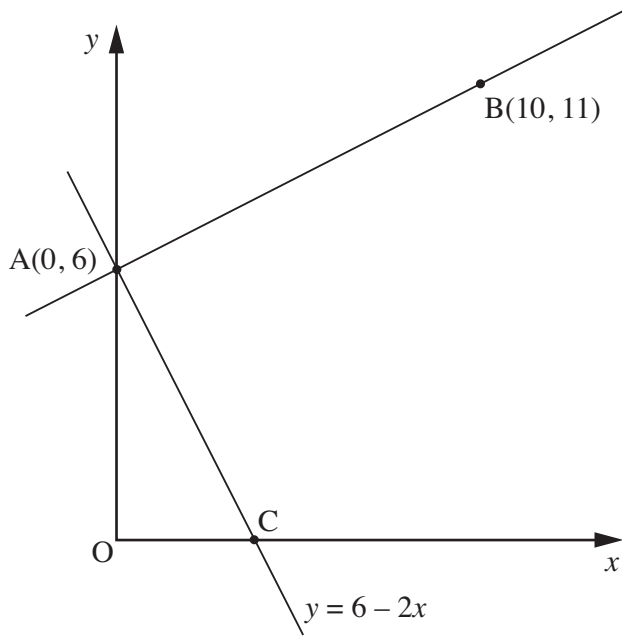
$$I = m \times v$$

- 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]



Not to scale

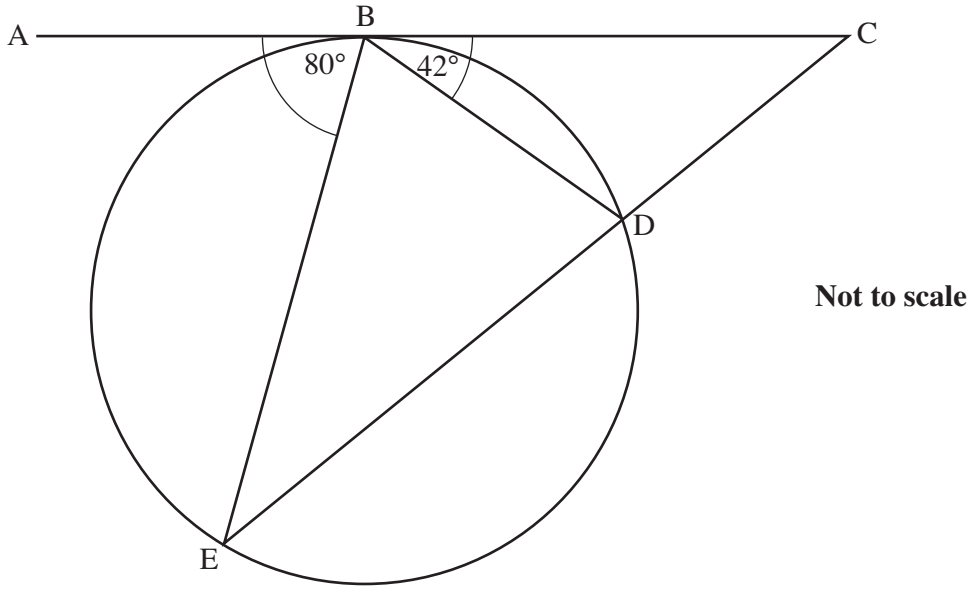
(a) Calculate the length AB.

(a) [3]

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

Show that the line AB is perpendicular to line AC.

.....
.....
.....
..... [3]



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]

- 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 determine whether or not they attend the club.
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 .

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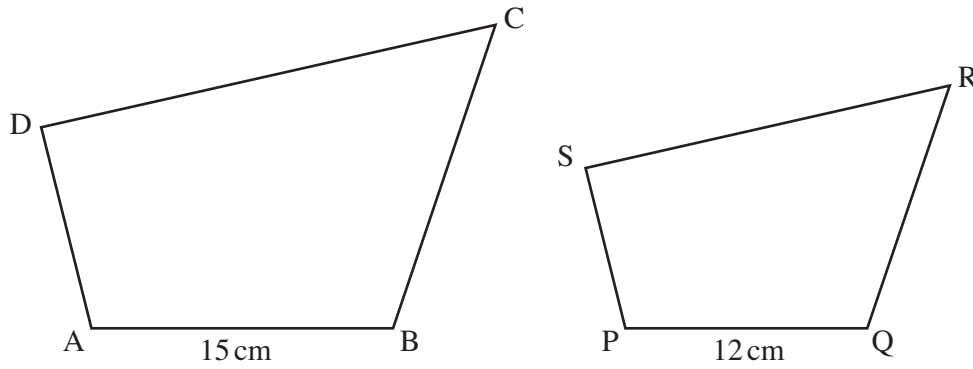
 [3]

- (b) Calculate y when $x = 2.4$.

(b) [1]

12

7



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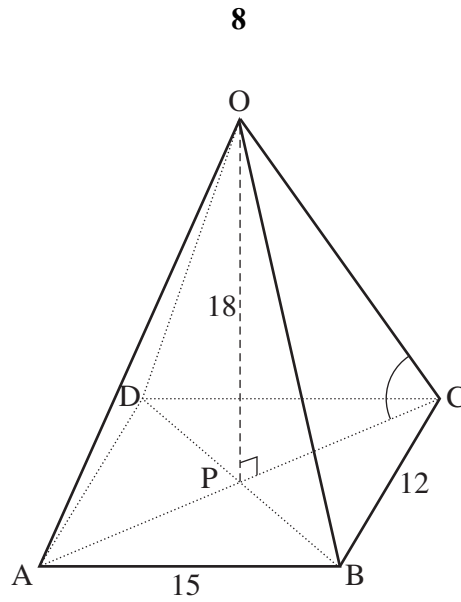
The two quadrilaterals, ABCD and PQRS, are similar.
The area of ABCD is 97.5 cm^2 .

Calculate the area of PQRS.

..... cm^2 [3]

TURN OVER FOR QUESTION 13

13



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]