OCR
RECOGNISING ACHIEVEMENT

# M9

## GENERAL CERTIFICATE OF SECONDARY EDUCATION

## MATHEMATICS C (GRADUATED ASSESSMENT) B279B

MODULE M9 – SECTION B

*OCE/T64053*

Candidates answer on the question paper

**OCR Supplied Materials:**
None

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

**Tuesday 23 June 2009**
**Morning**

**Duration:** 30 minutes

*B279B*

| Candidate Forename | | Candidate Surname | |
|---|---|---|---|

| Centre Number | | | | | | Candidate Number | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

**INSTRUCTIONS TO CANDIDATES**

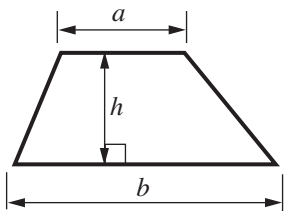
- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Show your working. 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**

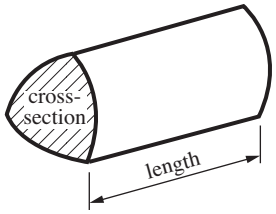
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- Section B starts with question 6.
- You are expected to use a calculator in Section B of this paper.
- Use the $\pi$ button on your calculator or take $\pi$ to be 3·142 unless the question says otherwise.
- The total number of marks for this Section is **25**.
- This document consists of **8** pages. Any blank pages are indicated.

## Formulae Sheet

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




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

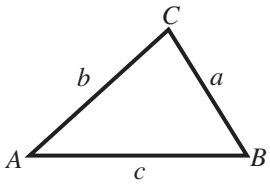



**In any triangle** $ABC$

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

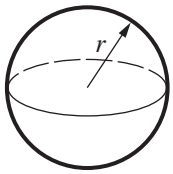
**Cosine rule** $a^2 = b^2 + c^2 - 2bc\cos A$

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



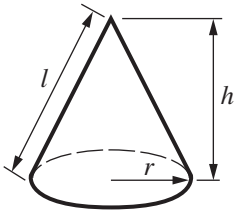

**Volume of sphere** = $\frac{4}{3}\pi r^3$

**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

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

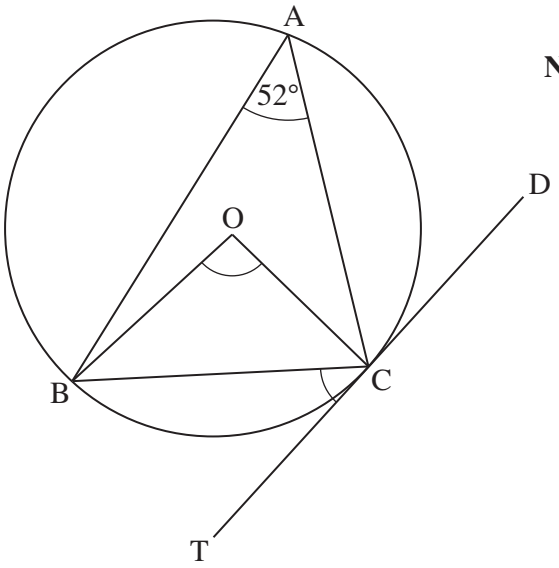
**PLEASE DO NOT WRITE ON THIS PAGE**

**6** Rearrange this formula to make $x$ the subject.

$y = 8x^3$

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

**7** A, B and C are points on a circle, centre O.
TCD is a tangent to the circle.
Angle BAC = 52°.




**Not to scale**

Find angles BOC and BCT, giving your reasons.

Angle BOC = .....° because .....

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

Angle BCT = .....° because .....

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

**8** Serena wishes to select a random stratified representative sample of size 100 from her school of 750 students.
There are 120 students in year 11, with 66 of these being girls.

How many year 11 girls should be in Serena's sample?

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

**9** Paul's computer on his bicycle shows that he has travelled 383 m to the nearest metre.
The time he has taken is 43·7 seconds, correct to 1 decimal place.

**(a)** Explain why the result of the calculation $\frac{383{\cdot}5}{43{\cdot}65}$ gives the upper bound of Paul's mean speed in metres per second.

.....

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

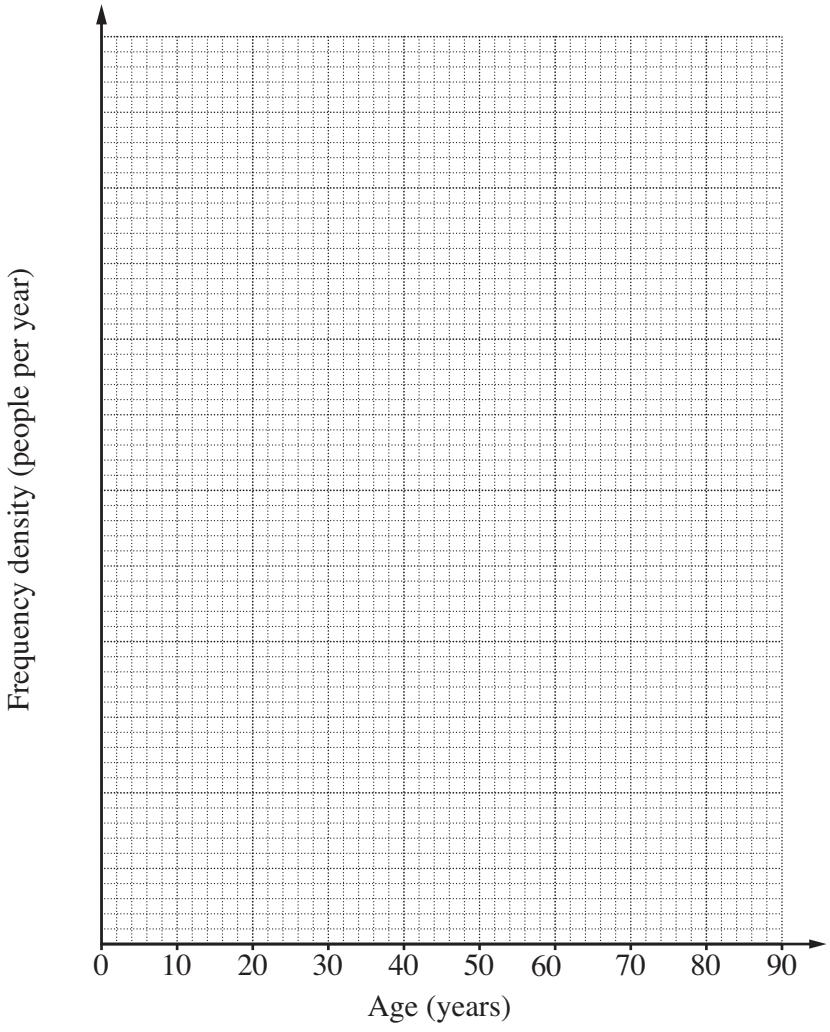
**(b)** Calculate the lower bound of Paul's mean speed.
Give your answer correct to 2 decimal places.

**(b)** ..... m/s **[2]**

**10** This table summarises the ages of the members of Parkview tennis club.

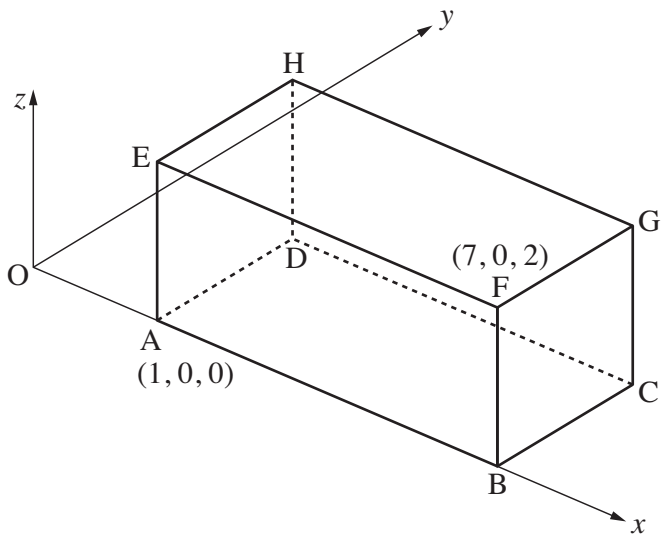
| Age ($x$ years) | Frequency |
|---|---|
| $5 \leqslant x < 10$ | 14 |
| $10 \leqslant x < 20$ | 34 |
| $20 \leqslant x < 40$ | 80 |
| $40 \leqslant x < 60$ | 92 |
| $60 \leqslant x < 90$ | 66 |

Draw a histogram to represent these data.




**[3]**

**11** ABCDEFGH is a cuboid with sides of length 6 units, 3 units and 2 units.
With coordinate axes as shown, A is the point (1, 0, 0) and F is (7, 0, 2).




**(a)** Find the coordinates of the midpoint of face EFGH.

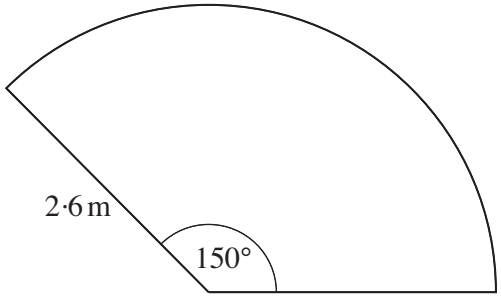
**(a)** (..... , ..... , .....) **[2]**

**(b)** Calculate the length BH.

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

**12** A flowerbed is a sector of a circle of radius 2·6 m.
The sector angle is 150°.

Calculate the area of the flowerbed.




**Not to scale**

..... $m^2$ **[3]**

**13** Two jugs are mathematically similar in shape.
The smaller one has height 11 cm and can hold 200 ml.
The larger one can hold 1 litre.

Calculate the height of the larger jug.

..... cm **[3]**

**PLEASE DO NOT WRITE ON THIS PAGE**