



# M10

**GENERAL CERTIFICATE OF SECONDARY EDUCATION  
MATHEMATICS C (GRADUATED ASSESSMENT)  
MODULE M10 – SECTION A**

## B280A

Candidates answer on the question paper.

**OCR supplied materials:**  
None

**Other materials required:**

- Geometrical instruments
- Tracing paper (optional)

**Tuesday 1 March 2011  
Morning**

**Duration: 30 minutes**



Candidate forename		Candidate surname	
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Centre number							Candidate number				
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**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**

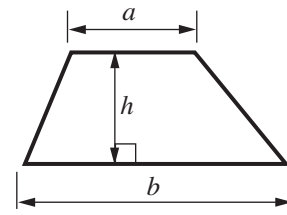
- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this Section is **25**.
- This document consists of **8** pages. Any blank pages are indicated.

**WARNING**

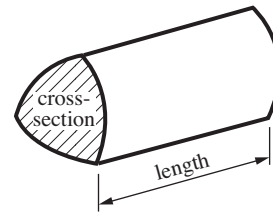
**No calculator can be used for Section A of this paper**

## Formulae Sheet

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



**Volume of prism** = (area of cross-section)  $\times$  length

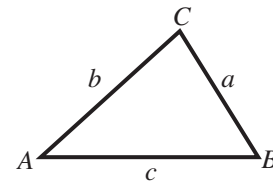


**In any triangle  $ABC$**

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

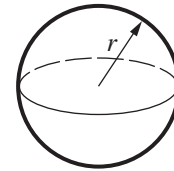
**Cosine rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

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



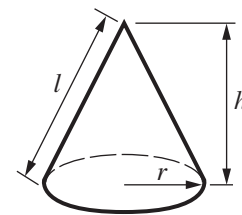
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

**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**

1 Factorise and simplify.

$$\frac{x^2 - 6x + 8}{3x^2 - 12}$$

.....[3]

2 (a) Simplify  $\sqrt{180}$ . Give your answer in the form  $a\sqrt{5}$ .

(a) .....[2]

(b) Expand and simplify.

$$(2 + \sqrt{3})(7 - \sqrt{3})$$

Give your answer in the form  $c + d\sqrt{3}$ .

(b) .....[2]

3 Solve algebraically these simultaneous equations.

$$y = 2x^2 - 5x - 1$$

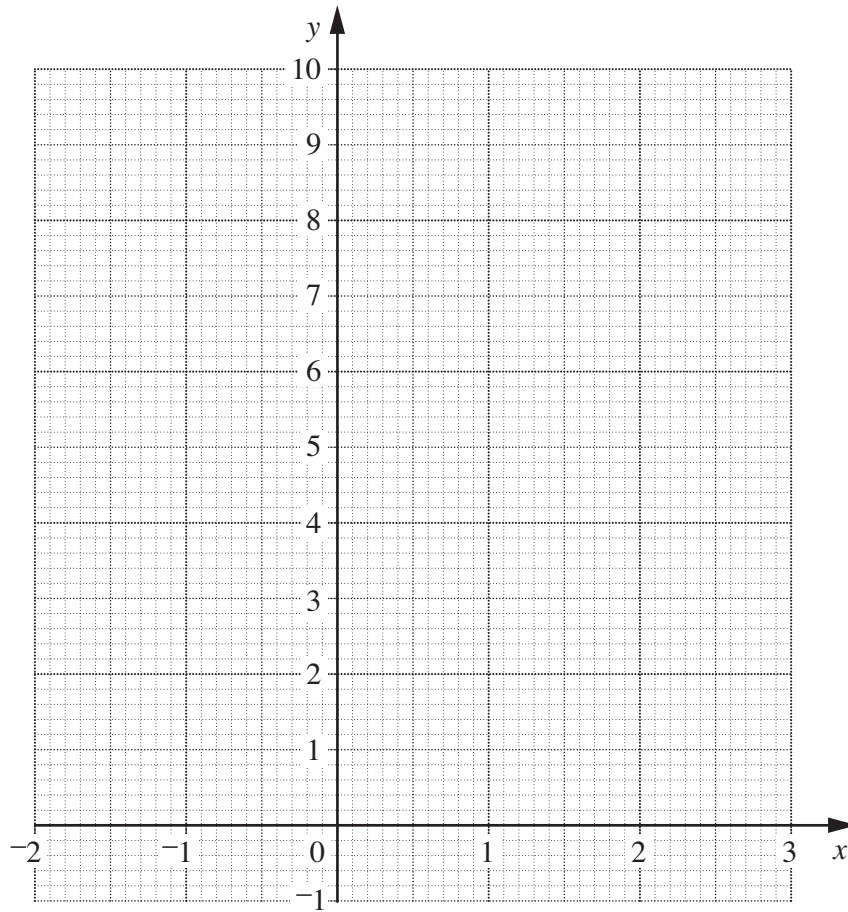
$$y = 2x - 4$$

$$x = \dots\dots\dots, y = \dots\dots\dots$$

$$\text{or } x = \dots\dots\dots, y = \dots\dots\dots \mathbf{[6]}$$

4 (a) Draw the graph of  $y = 2^x$  for values of  $x$  from  $-2$  to  $3$ .

$x$	-2	-1	0	1	2	3
$y$						

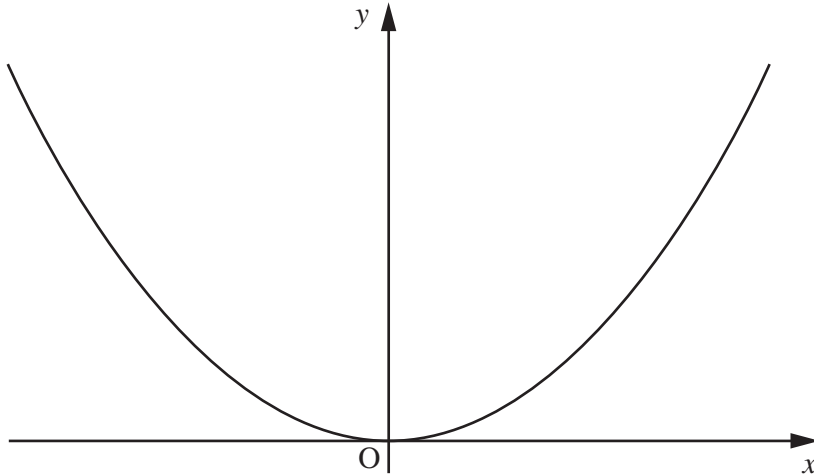


[3]

(b) Use your graph to find an approximate solution of the equation  $2^x = 5$ .

(b) ..... [1]

5



This is a sketch of the graph of  $y = 2x^2$ .

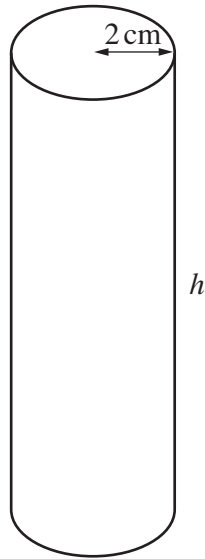
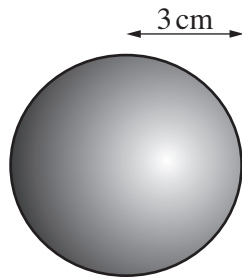
(a) On the same axes, sketch the graph of  $y = x^2$ .

[1]

(b) The graph of  $y = 2x^2$  is translated by  $\begin{pmatrix} 3 \\ 0 \end{pmatrix}$ .  
Write the equation of the resulting graph.

(b) ..... [2]

- 6 A solid metal sphere of radius 3 cm is melted and recast as a cylinder of radius 2 cm. No metal is wasted, so the volumes are the same.



Calculate the height of the cylinder.  
Show your method clearly.  
Do not substitute a number for  $\pi$  in your calculations.

..... cm [5]

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