

GENERAL CERTIFICATE OF SECONDARY EDUCATION MATHEMATICS C (GRADUATED ASSESSMENT)

MODULE M9 - SECTION A

Morning

WEDNESDAY 27 JUNE 2007

Time: 30 minutes

Candidates answer on the question paper. Additional materials: Geometrical instruments



	Tracing paper (optional)			
Candidate Name				
Centre Number		Candidate Number		

INSTRUCTIONS TO CANDIDATES

- Write your name, Centre Number and Candidate Number in the boxes above.
- Answer all the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- In many questions marks will be given for a correct method even if the answer is incorrect.
- Do not write in the bar code.
- Do **not** write outside the box bordering each page.
- WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.

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.

WARNING

You are not allowed to use a calculator in Section A of this paper.

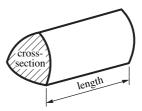
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Section A		
Section B		
Total		

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Formulae Sheet

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

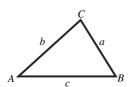


In any triangle ABC

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

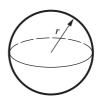
Cosine rule
$$a^2 = b^2 + c^2 - 2bc \cos A$$

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



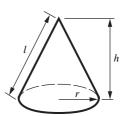
Volume of sphere =
$$\frac{4}{3}\pi r^3$$

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



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

Curved surface area of cone =
$$\pi rl$$



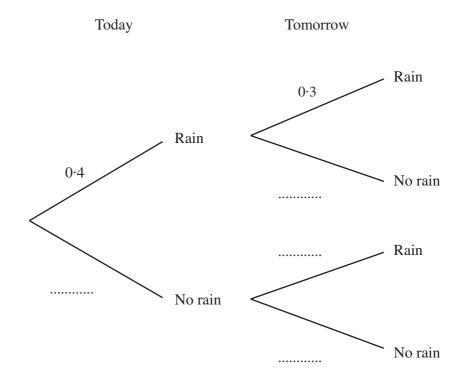
The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$, where $a \ne 0$, are given by

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

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- 1 The weather forecast for today says there is a 40% chance of rain. The weather forecast for tomorrow says there is a 30% chance of rain. Assume these events are independent.
 - (a) Complete the tree diagram.



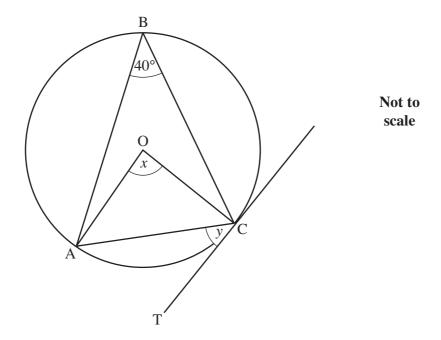
[2]

(b) Calculate the probability of **no** rain on **both** days.

(b)[2]

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	4	
2	Work out.	
	(a) 3^{-2}	
		(a)[1]
	(b) $8^{\frac{1}{3}}$	
		(b) [1]
		2
3	When she was born Lily weighed 3 kg, correct to the nearest kilogram. When she was three months old Lily weighed 6 kg, correct to the nearest	t kilogram.
	What is the upper bound of the weight she has gained?	
		kg [2]
		2



A, B and C are points on the circle, centre O. CT is the tangent to the circle at C. Angle $ABC = 40^{\circ}$.

Find angle *x* and angle *y*. Give a reason for each of your answers.

<i>x</i> =	° because	
		[2]
		[-]
v =	° because	
,		
		[2]
••••••	***************************************	

4

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_	()	6		
5	(a)	Factorise. $3ab + 15b^2$		
		300 + 130	(a)	[2
	(b)	Simplify.		
		$\frac{x^2 - 6x - 7}{x + 1}$		
			(b)	[3]
				5
6	Sam	n and Michael are comparing their homework.		1
		Sam	Michael	
		$(3.2 \times 10^2) \times (9.5 \times 10^{-3}) = 304$	$(3.2 \times 10^2) \times (9.5 \times 10^{-3}) = 3.04$	
	Use	o has the correct answer? estimation to show how you decide. w clearly the values you use.		
	•••••	is right be	ecause the correct answer is approximate	ly
				[3]

7 It is given that

$$y \propto \frac{1}{x^2}$$

and y = 9 when x = 2.

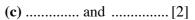
(a) Find a formula connecting y and x.

(a)	 	 	[2]

(b) Calculate y when x = 10.



(c) Calculate the values of x when y = 4.





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GENERAL CERTIFICATE OF SECONDARY EDUCATION MATHEMATICS C (GRADUATED ASSESSMENT)

MODULE M9 - SECTION B

Time: 30 minutes

Morning

WEDNESDAY 27 JUNE 2007

Candidates answer on the question paper.



Additional materials.		Tracing paper (optional) Scientific or graphical calculator			
Candidate Name					
Centre Number			Candidate Number		

INSTRUCTIONS TO CANDIDATES

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INFORMATION FOR CANDIDATES

- You are expected to use a calculator in Section B of this paper.
- 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.
- Section B starts with question 8.
- Use the π button on your calculator or take π to be 3·142 unless the question says otherwise.

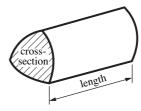
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Formulae Sheet

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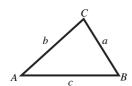


In any triangle ABC

Sine rule
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Cosine rule
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Area of triangle =
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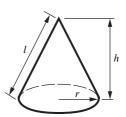
Volume of sphere =
$$\frac{4}{3}\pi r^3$$

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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 $a \ne 0$, are given by

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

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8 (a) Rearrange this formula to make y the subject.

$$3(x-5y) = y-2$$

(a)[3]

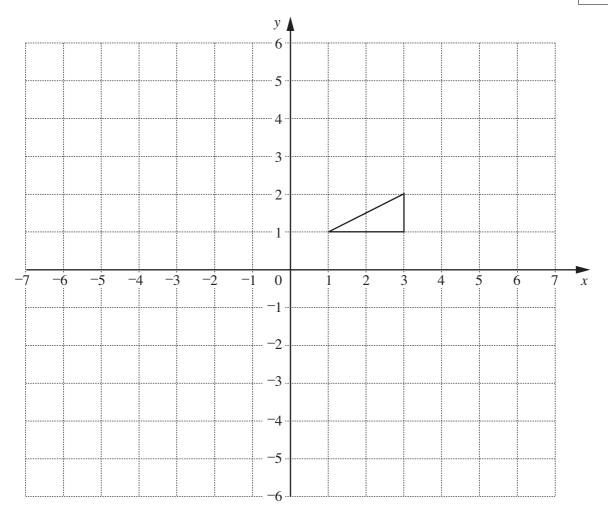
(b) Expand and simplify.

$$(2x+5)(x-2)$$

(b)[3]

6

9

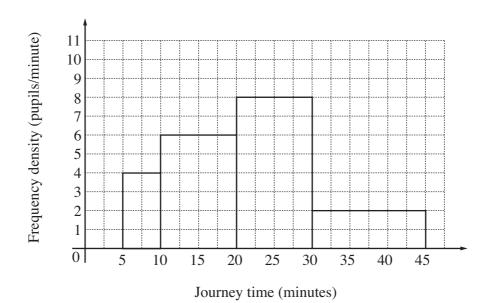


Enlarge the triangle with scale factor -2 from centre 0.

[2]

[Turn over

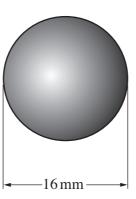
10 This histogram shows the distribution of journey times for pupils travelling to school.



(a) How many pupils had a journey time of between 10 and 20 minutes?

(b) What percentage of pupils have a journey time of between 10 and 20 minutes?

(b)% [2]



A Tastyfruit sweet is a sphere with diameter 16 mm.

(a) Calculate the volume of one Tastyfruit sweet.

(a) mm ³ [2]
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(b) A Superfruit sweet has twice the volume of a Tastyfruit sweet.

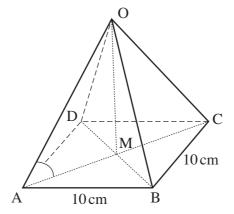
Calculate the diameter of a Superfruit sweet.

(b)mm [2]

12 (a) Find the gradient of a line which is perpendicular to the line y = 2x + 1.

e passes through the points (-2, 14) and (1, 5). Find the gradient of this line.	(a) (-2, 14)	Not to scale	[1]
Find the equation of this line. Give your answer in the form $y = mx + c$.	(b)(i))	[2]

(ii)	[2]
	5



OABCD is a square-based pyramid. The vertex, O, is vertically above M, the centre of the base. $AB = 10\,\text{cm}$, $OM = 12\,\text{cm}$.

Calculate angle OAM.

.....° [5]

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