

Monday 16 January 2012 – Morning

GCSE MATHEMATICS C (GRADUATED ASSESSMENT)

B280A MODULE M10 – SECTION A

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:

- Geometrical instruments
- Tracing paper (optional)

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. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure 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.
- 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).
- 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 **12** pages. Any blank pages are indicated.

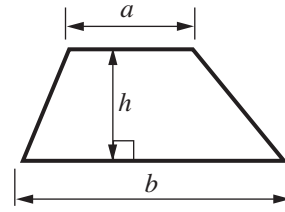
WARNING

No calculator can be used for Section A of this paper

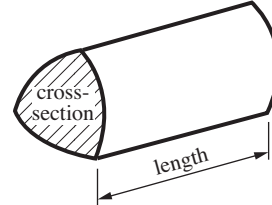
This paper has been pre modified for carrier language

Formulae Sheet

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



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

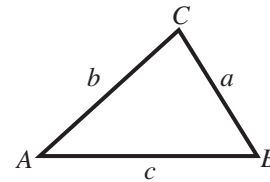


In any triangle ABC

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

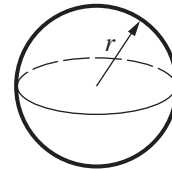
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



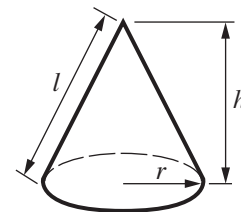
Volume of sphere = $\frac{4}{3}\pi r^3$

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

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

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- 1 This table shows the quarterly number of visitors, in thousands, to a country.

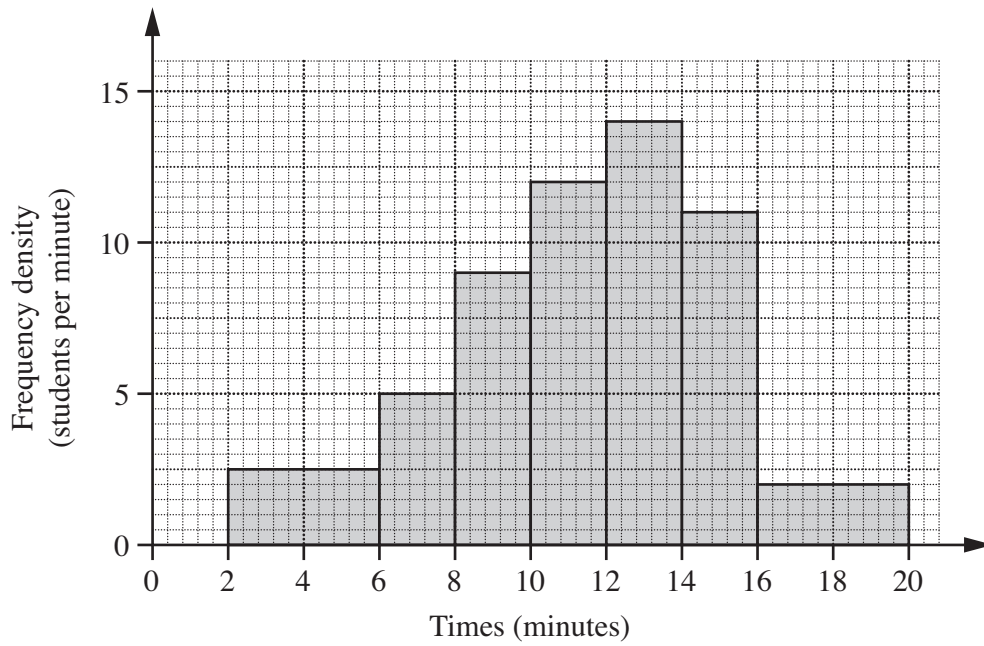
	Year		
	2005	2006	2007
1st quarter	4650	4700	5200
2nd quarter	5700	6100	
3rd quarter	5960	6980	
4th quarter	5275	5550	

The 4-point moving average for the third quarter of 2006 to the second quarter of 2007 is 6020 thousand.

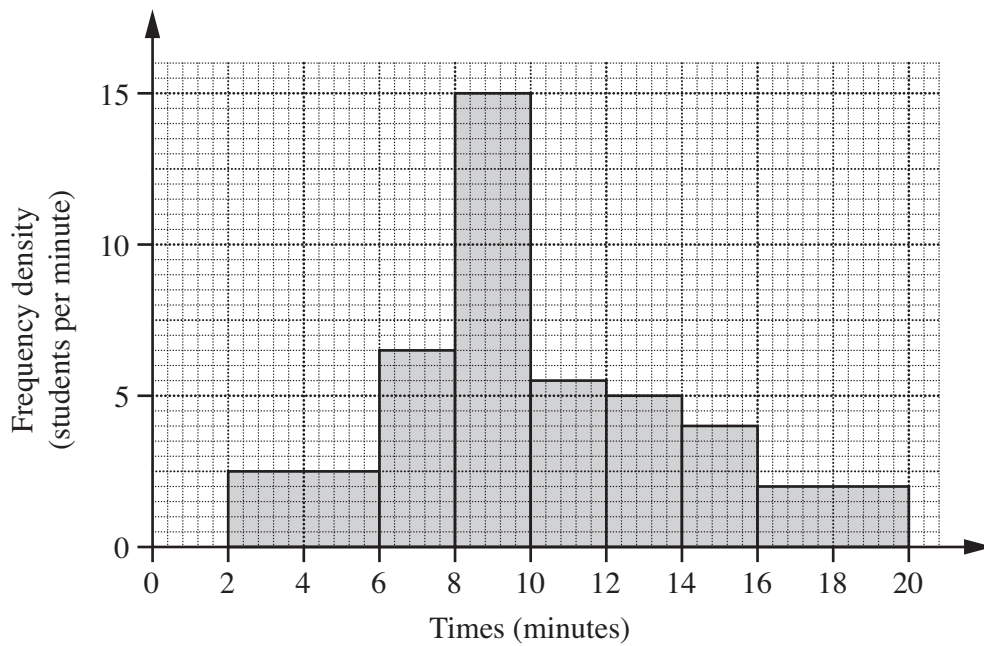
How many people visited this country in the second quarter of 2007?

..... thousand [3]

- 2 This histogram shows the distribution of the times some Year 7 students took to complete a puzzle.



This histogram shows the distribution of the times some Year 11 students took to complete the same puzzle.



Make two comments comparing the distributions of the times for the two year groups.

1

.....

2

..... [2]

3 (a) Write $\sqrt{5} + \sqrt{45}$ in the form $a\sqrt{5}$, where a is an integer.

(a) [2]

(b) Expand and simplify $(3 - \sqrt{2})^2$.
Write your answer in the form $a + b\sqrt{2}$, where a and b are integers.

(b) [3]

- 4 (a) Write the following as a single fraction.

$$\frac{3}{x+2} + \frac{4}{2x-1}$$

Write your answer as simply as possible.

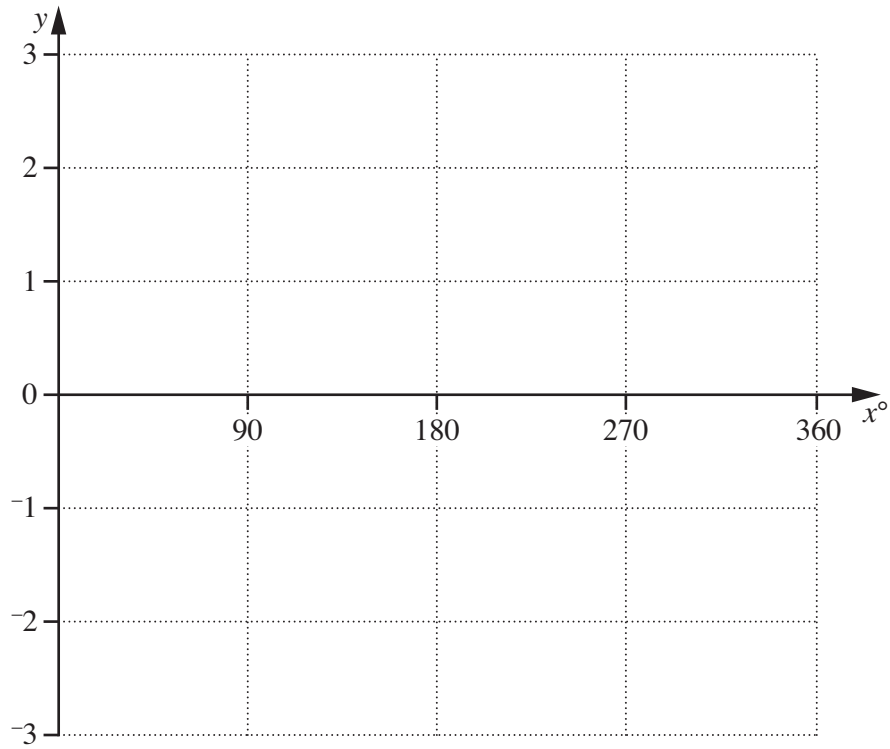
(a) [3]

- (b) Simplify.

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

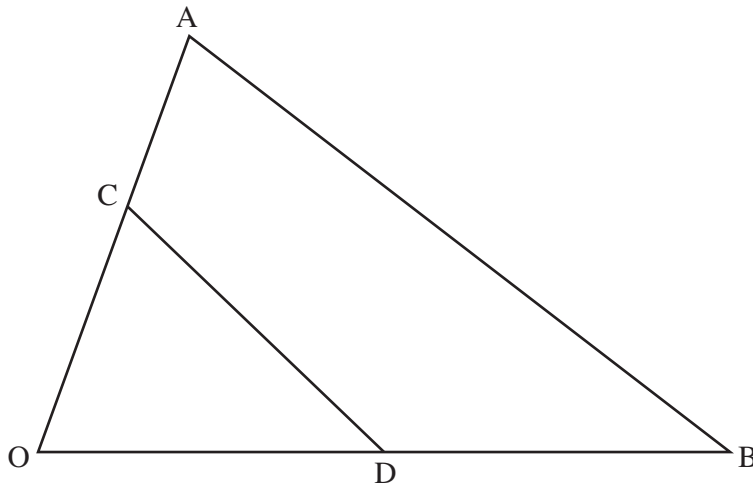
(b) [3]

5 Sketch the graph of $y = 3\sin 2x^\circ$ for $0 \leq x \leq 360$.



[3]

6 Look at the diagram below.



Not to scale

OCA and ODB are straight lines.
D is the midpoint of OB.

$$\vec{OC} = \mathbf{c} \text{ and } \vec{OB} = 2\mathbf{b}.$$

(a) Find, in terms of \mathbf{b} and \mathbf{c} , the vector \vec{CD} .

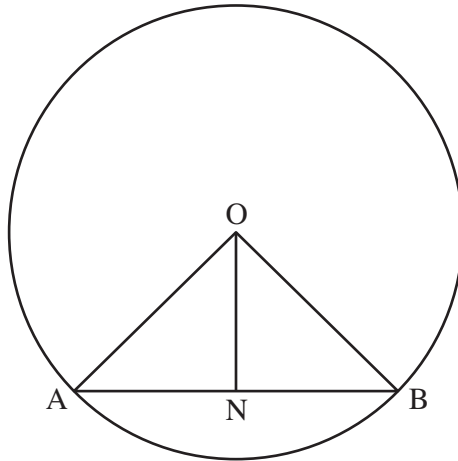
(a) [1]

(b) The vector $\vec{AB} = 2\mathbf{b} - 2\mathbf{c}$.

Explain how you know that AB and CD are parallel.

.....
..... [1]

- 7 AB is a chord of a circle, centre O.
N is the midpoint of the chord.



- (a) Complete this proof to show that triangle ONA is congruent to triangle ONB.

Statement

Reason

AN = NB

N is the midpoint of AB

.....

.....

.....

.....

so triangles ONA and ONB
are congruent

.....

[3]

- (b) Using your answer to part (a), what can be said about angle ONA?

.....

..... [1]

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