

Candidate forename		Candidate surname	
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Centre number						Candidate number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**  
**GCSE**  
**B280A**  
**MATHEMATICS C**  
**(GRADUATED ASSESSMENT)**  
**MODULE M10 – SECTION A**

**MONDAY 16 JANUARY 2012: Morning**

**DURATION: 30 minutes**

**SUITABLE FOR VISUALLY IMPAIRED CANDIDATES**

**Candidates answer on the Question Paper.**

**OCR SUPPLIED MATERIALS:**

**None**

**OTHER MATERIALS REQUIRED:**

**Geometrical instruments**

**Tracing paper (optional)**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

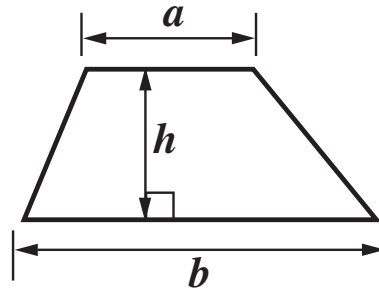
- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. HB pencil may be used for graphs and diagrams only.**
- **Answer ALL the questions.**
- **Read each question carefully. Make sure you know what you 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).**

## **INFORMATION FOR CANDIDATES**

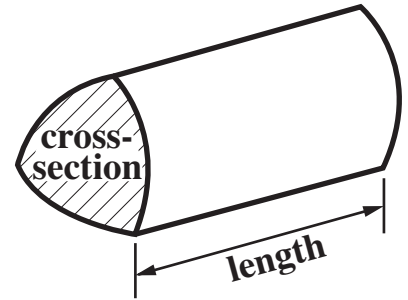
- **The number of marks is given in brackets [ ] at the end of each question or part question.**
- **The total number of marks for this Section is 25.**

## FORMULAE SHEET

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



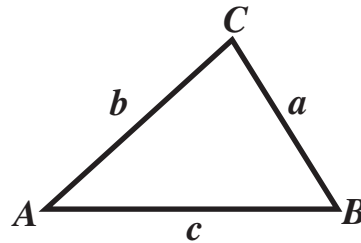
Volume of prism = (area of cross-section)  $\times$  length



In any triangle  $ABC$

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

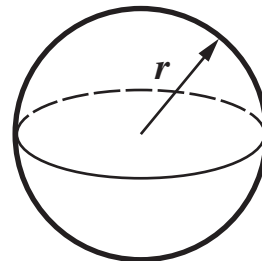
Cosine rule  $a^2 = b^2 + c^2 - 2bc \cos A$



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

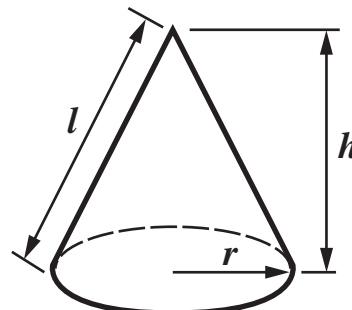
Volume of sphere =  $\frac{4}{3}\pi r^3$

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

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

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

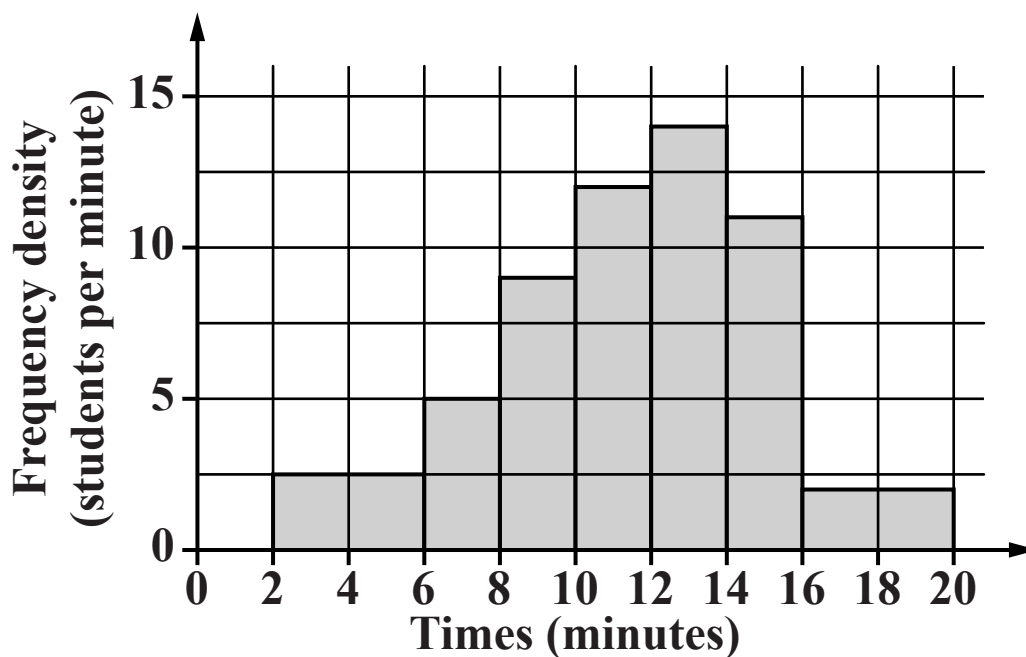
	YEAR		
	2005	2006	2007
1ST QUARTER	4650	4700	5200
2ND QUARTER	5700	6100	
3RD QUARTER	5960	6980	
4TH QUARTER	5275	5550	

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

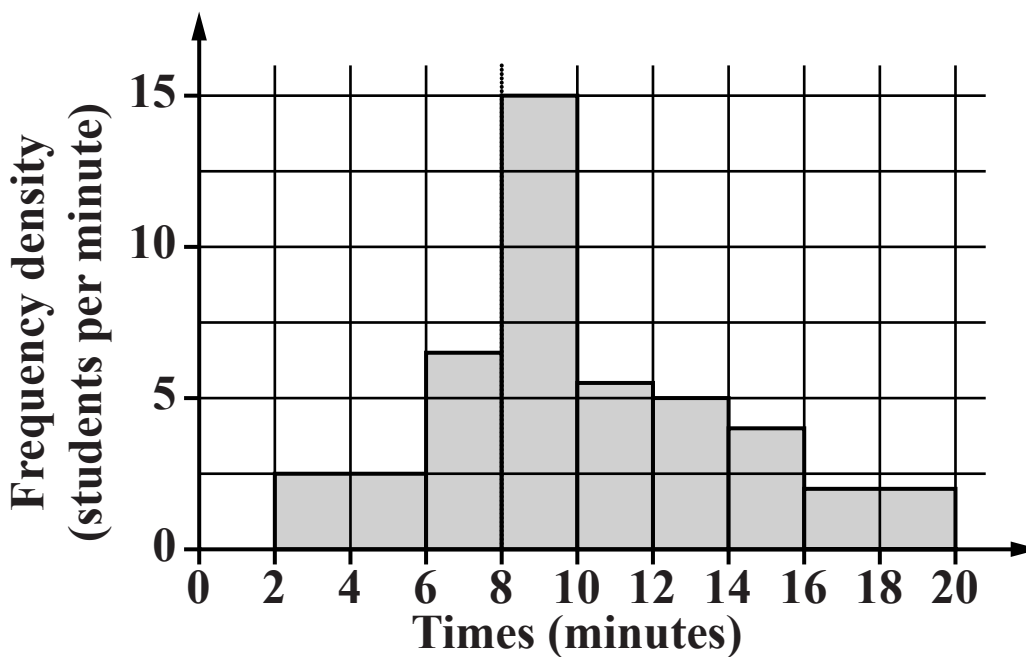
**How many people visited this country in the second quarter of 2007?**

\_\_\_\_\_ 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]

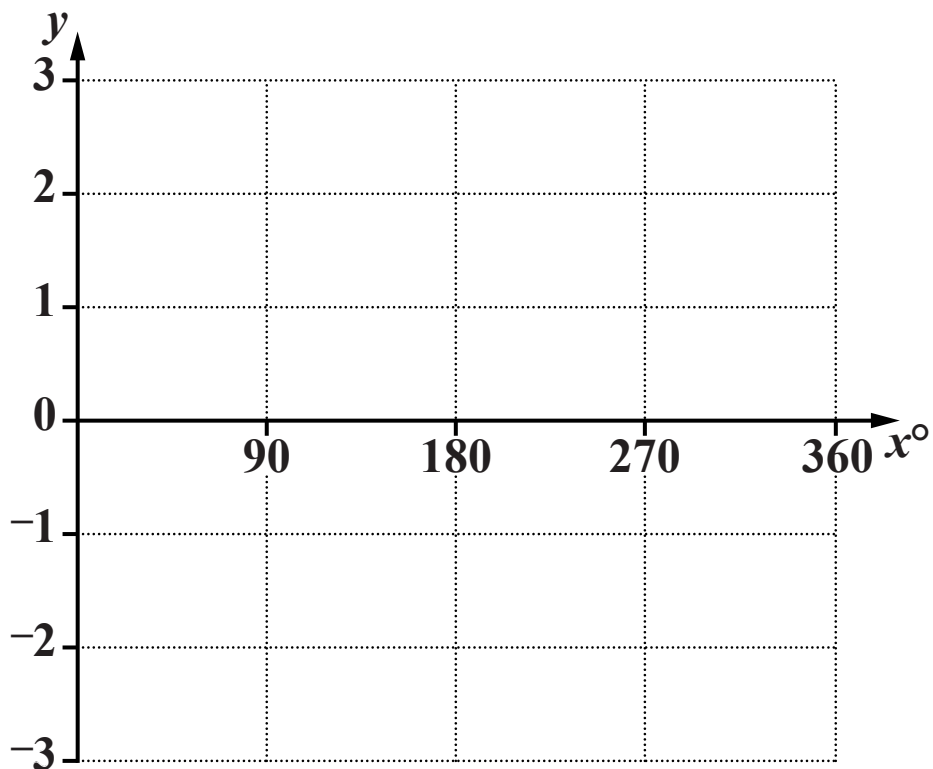


**(b) Simplify.**

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

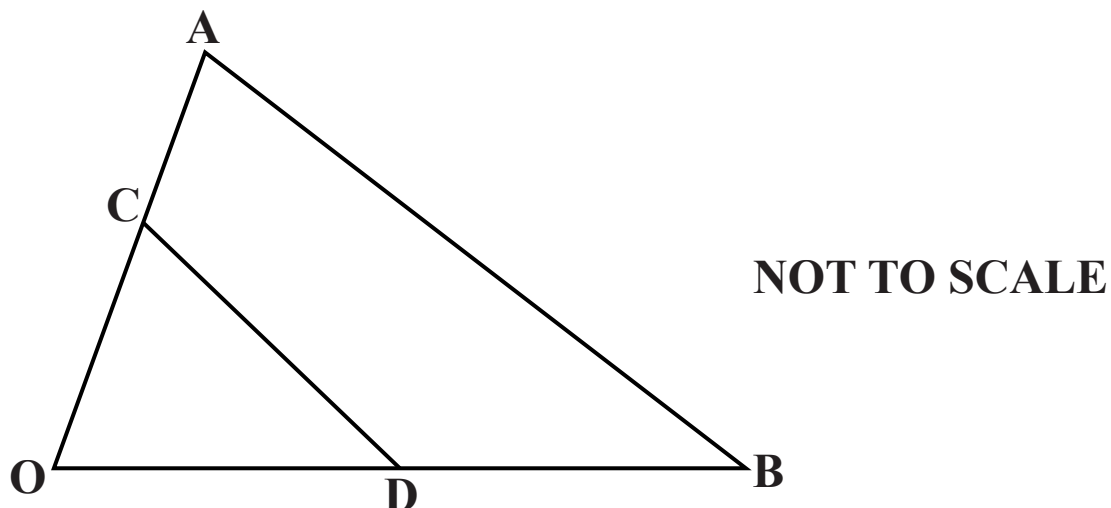
**(b)** \_\_\_\_\_ **[3]**

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



[3]

6 Look at the diagram below.



OCA and ODB are straight lines.

D is the midpoint of OB.

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

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

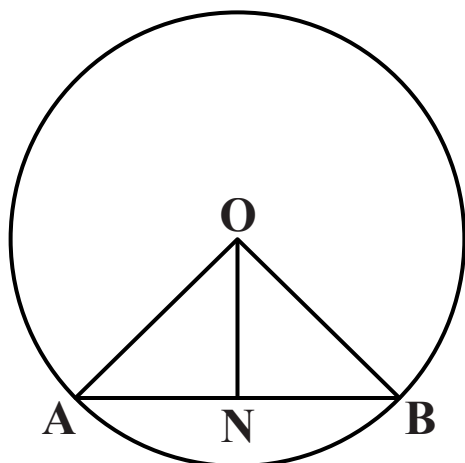
(a) \_\_\_\_\_ [1]

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

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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