

GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS C (GRADUATED ASSESSMENT)
MODULE M9 – SECTION B

B279B

Candidates answer on the Question Paper

OCR Supplied Materials:
None

Other Materials Required:

- Geometrical instruments
- Tracing paper (optional)
- Scientific or graphical calculator

Thursday 21 January 2010
Afternoon

Duration: 30 minutes



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

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

INSTRUCTIONS TO CANDIDATES

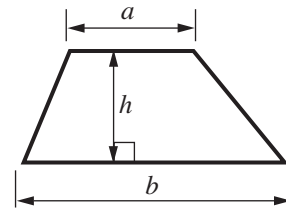
- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Show your working.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

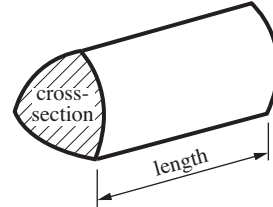
- The number of marks is given in brackets [] at the end of each question or part question.
- Section B starts with question 5.
- You are expected to use a calculator in Section B of this paper.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- The total number of marks for this Section is **25**.
- This document consists of **12** pages. Any blank pages are indicated.

Formulae Sheet

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



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

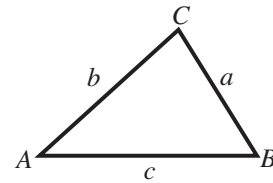


In any triangle ABC

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

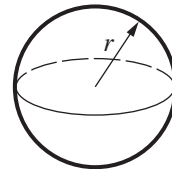
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



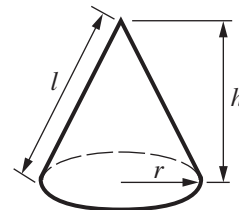
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

Curved surface area of cone = $\pi r l$

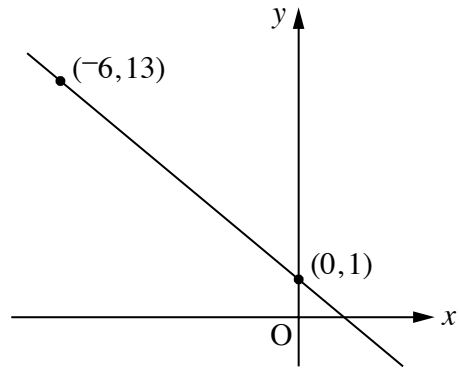


The Quadratic Equation

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



Not to scale

(a) Find the gradient of the line that passes through the points $(-6, 13)$ and $(0, 1)$.

(a) [1]

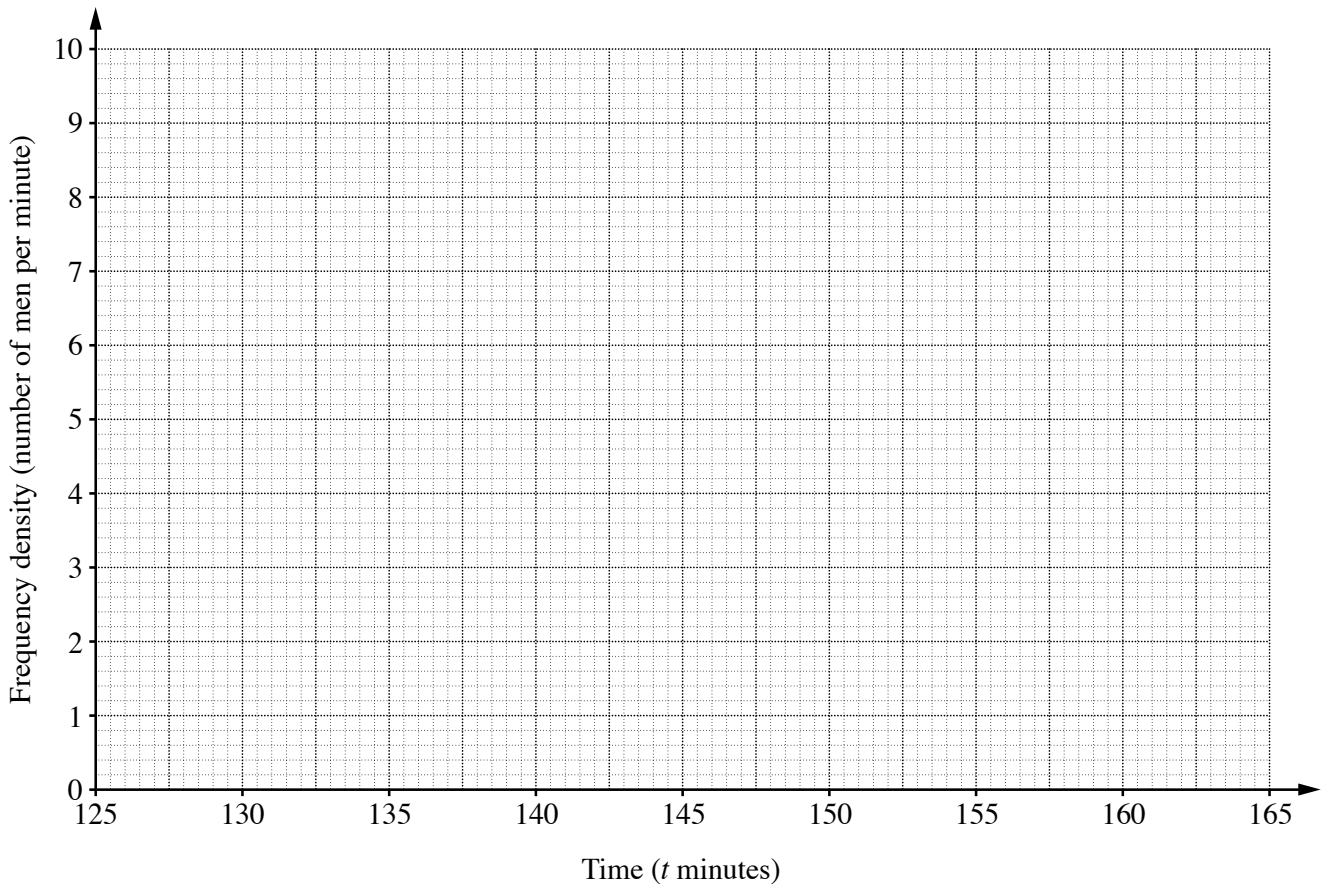
(b) Hence find the equation of the line.

(b) [2]

- 6 (a) The table shows the distribution of the times of the first hundred men in the Flora London Marathon in 2006.

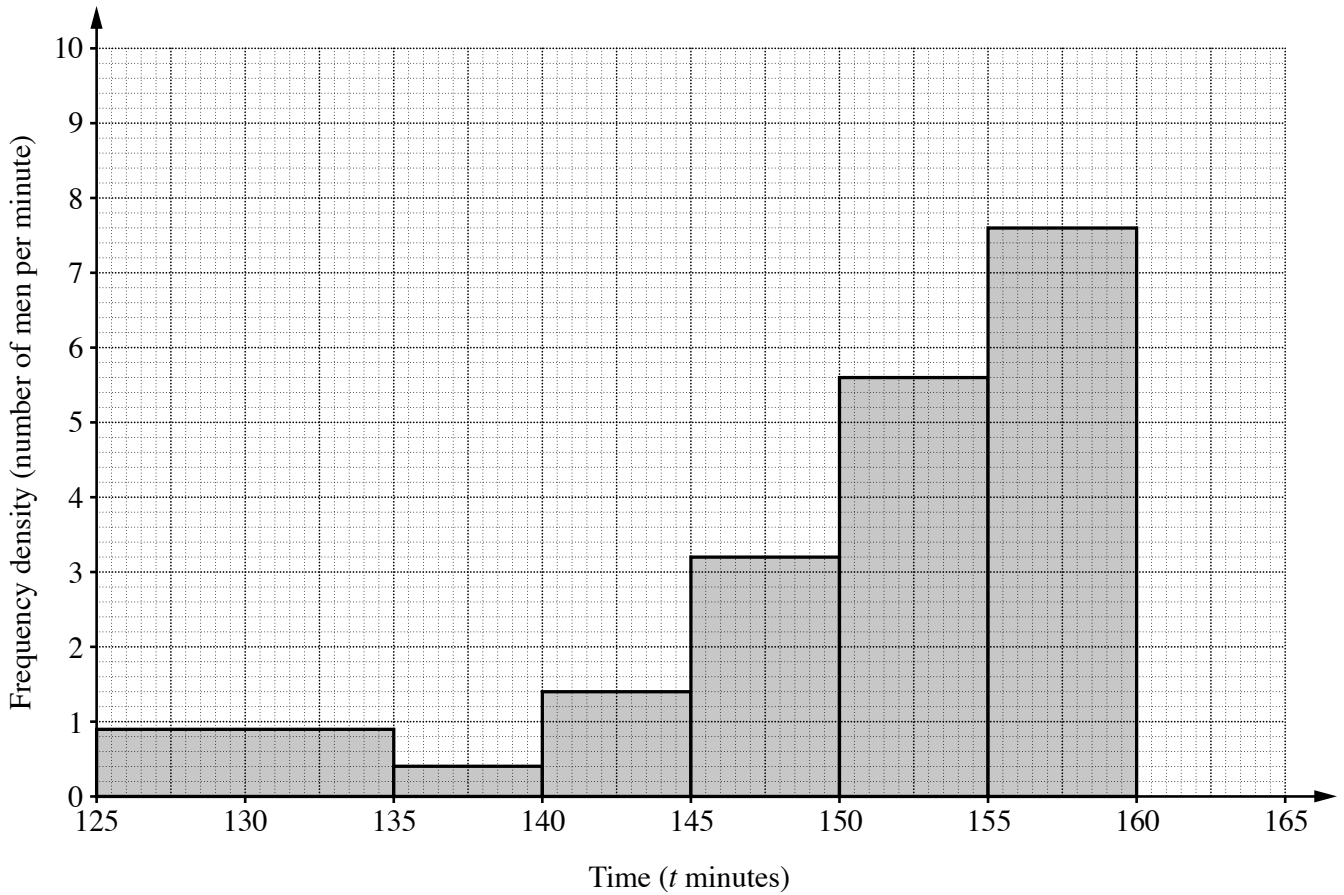
Time (t minutes)	Frequency
$125 < t \leq 135$	14
$135 < t \leq 140$	14
$140 < t \leq 145$	10
$145 < t \leq 150$	23
$150 < t \leq 155$	39

Draw a histogram to show this information.



[3]

(b) This histogram shows the distribution of the times of the first hundred men in the Flora London Marathon in 2007.



Use the histograms to make two comparisons between the distributions of the times in 2006 and in 2007.

- 1
-
- 2
- [2]

6

7 (a) The volume, V , of a sphere, radius r , is given by this formula.

$$V = \frac{4\pi r^3}{3}$$

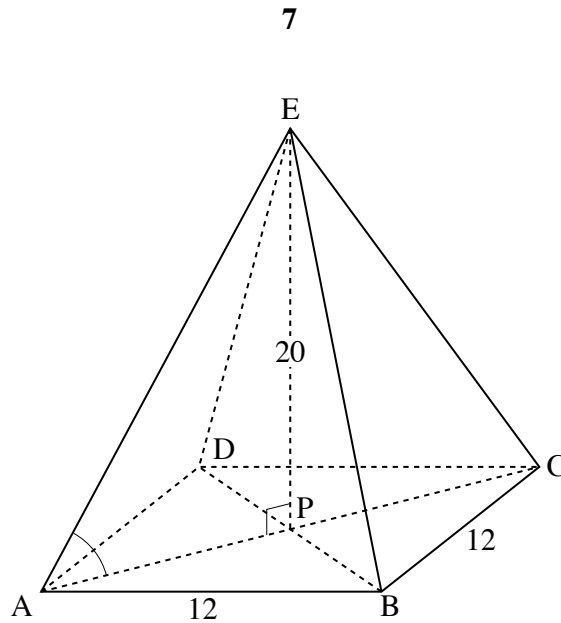
Rearrange the formula to make r the subject.

(a) [3]

(b) The radius of a sphere is 5.2 cm, correct to one decimal place.

Calculate the lower bound of the volume of the sphere.

(b)cm³ [2]

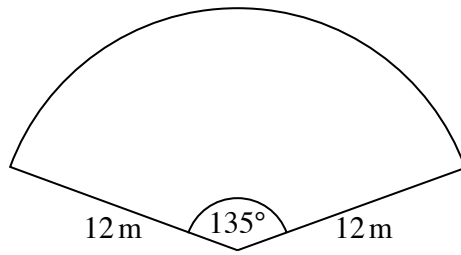


ABCDE is a square-based pyramid.
 Its sloping edges are all equal.
 P is the centre of the base.
 Each side of the base is 12 cm long.
 The height EP is 20 cm.

(a) Show that $AP = 8.49$ cm, correct to two decimal places. [2]

(b) Calculate the angle EAP.

(b)° [3]



Not to scale

The diagram shows a lawn cut in the shape of a sector of a circle.
The radius is 12 m and the angle of the sector is 135° .

Calculate the length of edging strip needed to go round the perimeter of the lawn.

..... m [3]

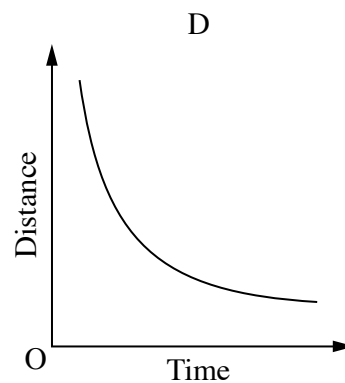
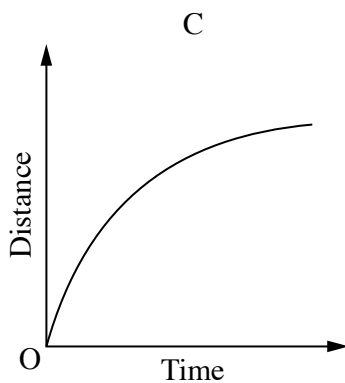
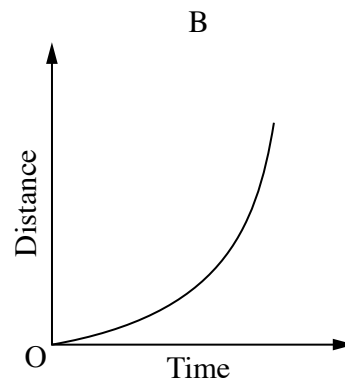
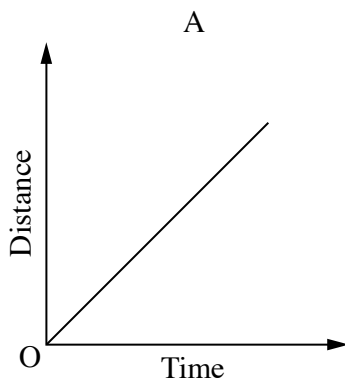
10 An object travels in a straight line.

The distance travelled, d metres, is directly proportional to the square of the travelling time, t seconds.
 The object moves a distance of 20 metres in 2.5 seconds.

(a) Find an equation for d in terms of t .

(a)..... [3]

(b) Which of these graphs, A, B, C or D, represents the relationship between the distance and the travelling time?



(b) [1]

PLEASE DO NOT WRITE ON THIS PAGE

11
BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

PLEASE DO NOT WRITE ON THIS PAGE



Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations, is given to all schools that receive assessment material and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.