

Candidate forename		Candidate surname	
-----------------------	--	----------------------	--

Centre number						Candidate number				
------------------	--	--	--	--	--	---------------------	--	--	--	--

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

B280A

**MATHEMATICS C
(GRADUATED ASSESSMENT)**

MODULE M10 (SECTION A)

TUESDAY 21 JUNE 2011: Afternoon

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)

WARNING

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

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

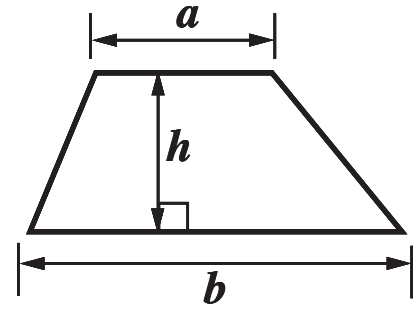
- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Read each question carefully. Make sure you know what you have to do before starting your answer.**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

INFORMATION FOR CANDIDATES

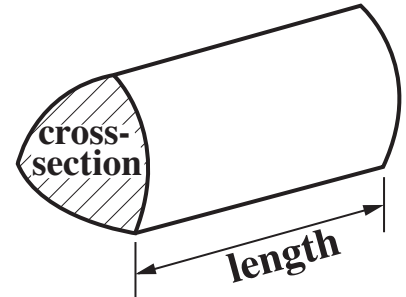
- **The number of marks is given in brackets [] at the end of each question or part question.**
- **The total number of marks for this Section is 25.**

FORMULAE SHEET

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

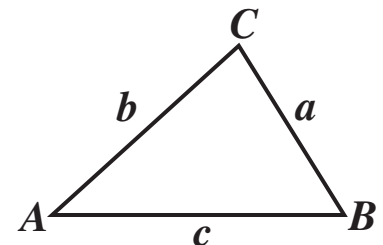


Volume of prism = (area of cross-section) \times length



In any triangle ABC

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

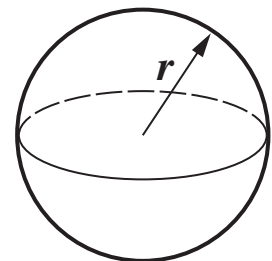


Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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

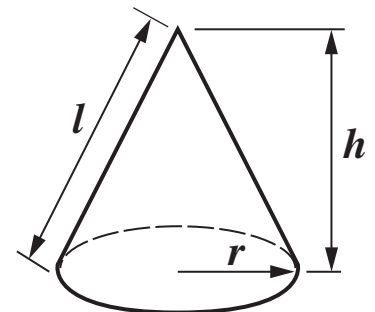
Volume of sphere = $\frac{4}{3}\pi r^3$

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 (a) Express each of these decimals as fractions.

(i) $0.\dot{6}$

(a)(i) _____ [1]

(ii) $0.0\dot{6}$

(ii) _____ [1]

(b) Hence, or otherwise, express $0.7\dot{6}$ as a fraction in its simplest form.

(b) _____ [2]

2 (a) Simplify.

$$\frac{6x^2 + 2x}{4x}$$

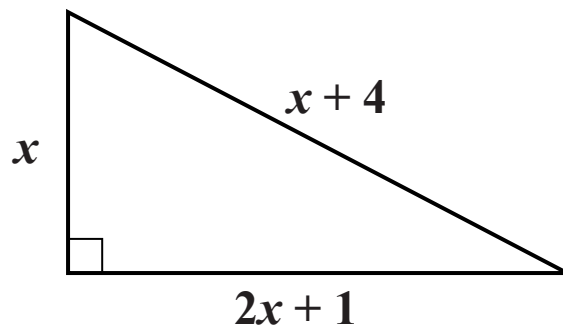
(a) _____ **[2]**

**(b) Write as a single fraction.
Simplify your answer.**

$$\frac{3}{x} + \frac{7}{x+2}$$

(b) _____ **[2]**

- 3** The diagram shows a right-angled triangle.
All lengths are in centimetres.



Not to scale

- (a) Use Pythagoras' theorem to show that $4x^2 - 4x - 15 = 0$.
[2]

(b) Hence find the length of the shortest side of the triangle.

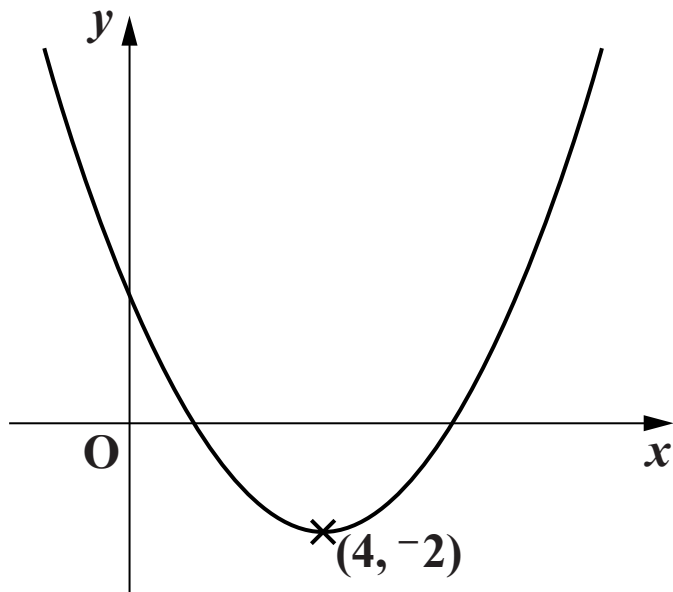
(b) _____ cm [3]

4 Simplify, giving your answer in the form $a + b\sqrt{3}$.

$$\frac{12 + \sqrt{3}}{\sqrt{3}}$$

_____ [2]

5 This is a sketch of $y = f(x)$.



Not to scale

The minimum point of the graph is $(4, -2)$.

Write down the coordinates of the minimum point for each of the following graphs.

(a) $y = f(x + 3)$

(a) (_____ , _____) [1]

(b) $y = f(x) + 3$

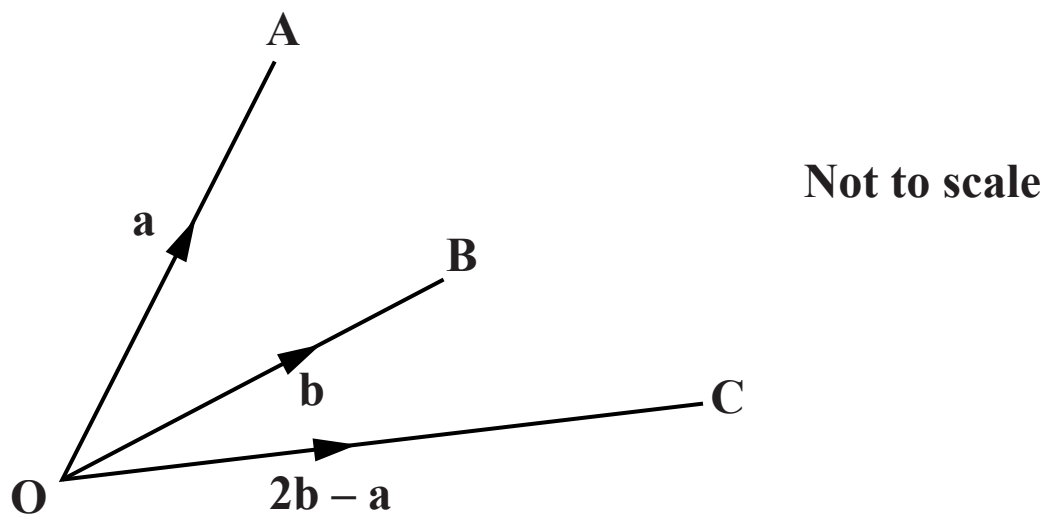
(b) (_____ , _____) [1]

(c) $y = 3f(x)$

(c) (_____ , _____) [1]

6 In the diagram below,

$$\vec{OA} = \mathbf{a}, \quad \vec{OB} = \mathbf{b}, \quad \vec{OC} = 2\mathbf{b} - \mathbf{a}.$$



(a) Find the following vectors in terms of \mathbf{a} and \mathbf{b} .

(i) \vec{AB}

(a)(i) _____ [1]

(ii) \vec{AC}

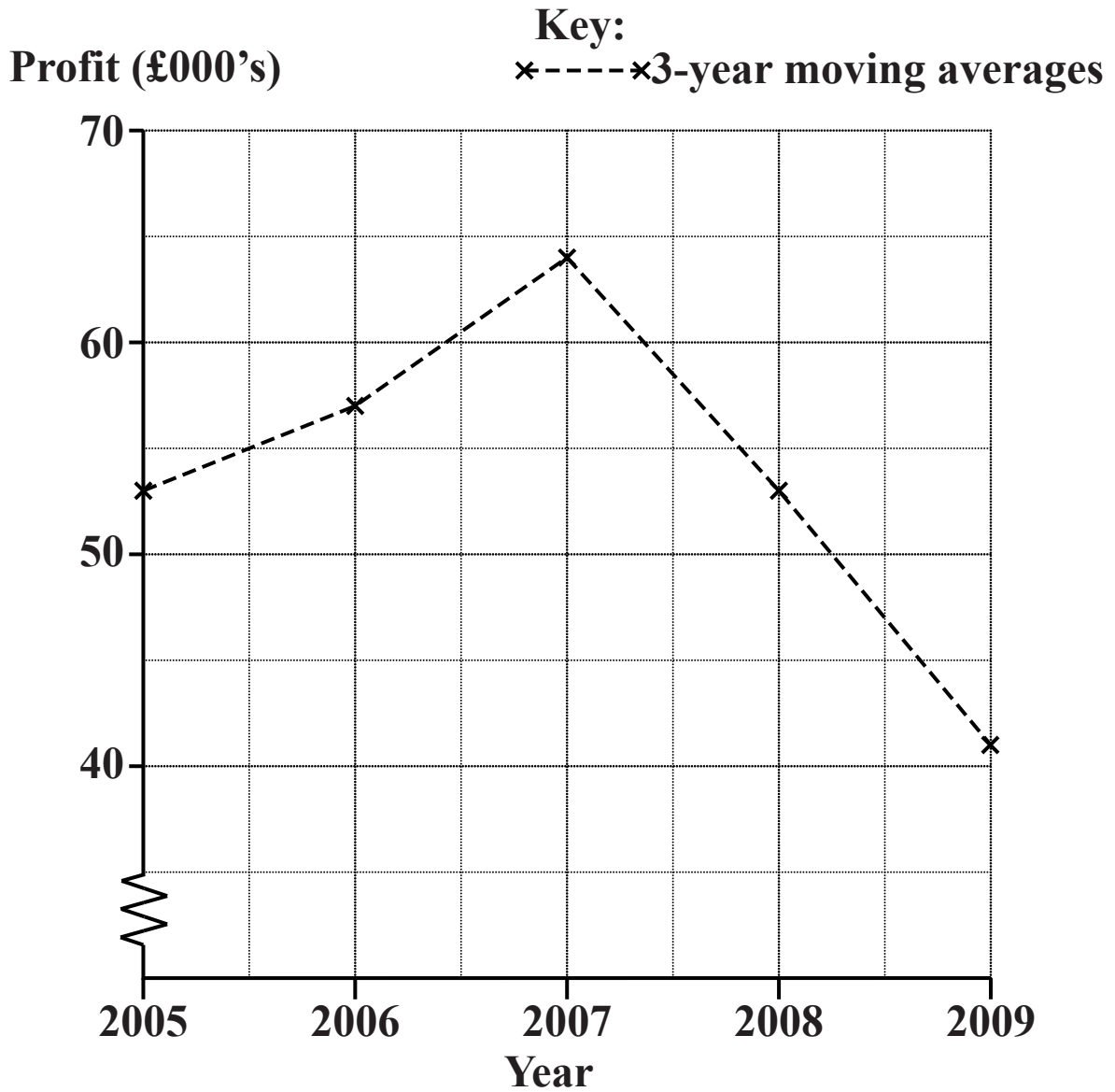
(ii) _____ [1]

(b) What can you deduce about the points A, B and C?

[2]

TURN OVER FOR QUESTION 7

- 7 A company sells garden furniture.
The graph shows the 3-year moving averages for the company's profits.



**In 2009 the company made a profit of £29 000.
In 2010 the company made a profit of £36 000.**

Use the graph to help you work out the profit the company made in 2008.

£ _____ [3]

BLANK PAGE

BLANK 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 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.