

Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

B280A

**MATHEMATICS C
(GRADUATED ASSESSMENT)**

MODULE M10 – SECTION A

MONDAY 21 JUNE 2010: 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

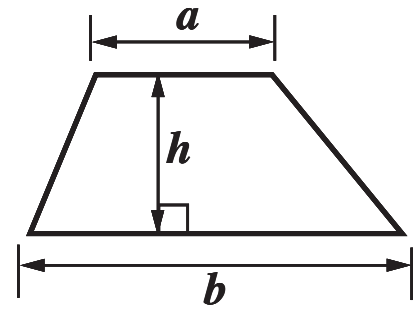
- **Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Read each question carefully and make sure that you know what you have to do before starting your answer.**
- **Show your working. Marks may be given for a correct method even if the answer is incorrect.**
- **Answer ALL the questions.**
- **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

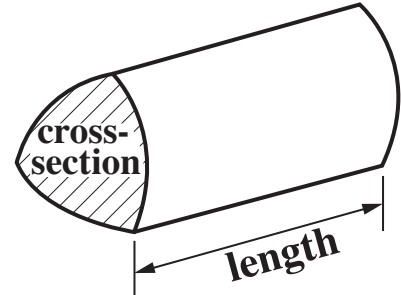
- **The number of marks is given in brackets [] at the end of each question or part question.**
- **The total number of marks for this Section is 25.**

FORMULAE SHEET

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



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

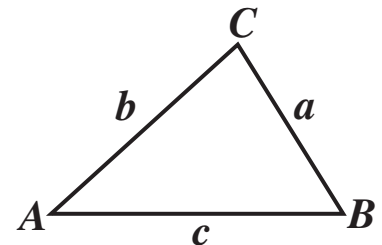


In any triangle ABC

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

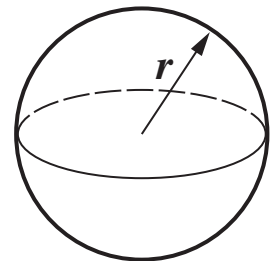
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



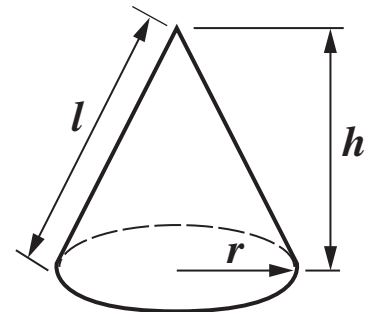
Volume of sphere = $\frac{4}{3}\pi r^3$

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 (a) Write $0.\dot{7}\dot{3}$ as a fraction.
[2 marks]

(a) _____



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(b) Work out.

$$36^{-\frac{1}{2}}$$

[2 marks]

(b) _____

(c) Expand.

$$(\sqrt{5} - 2)^2$$

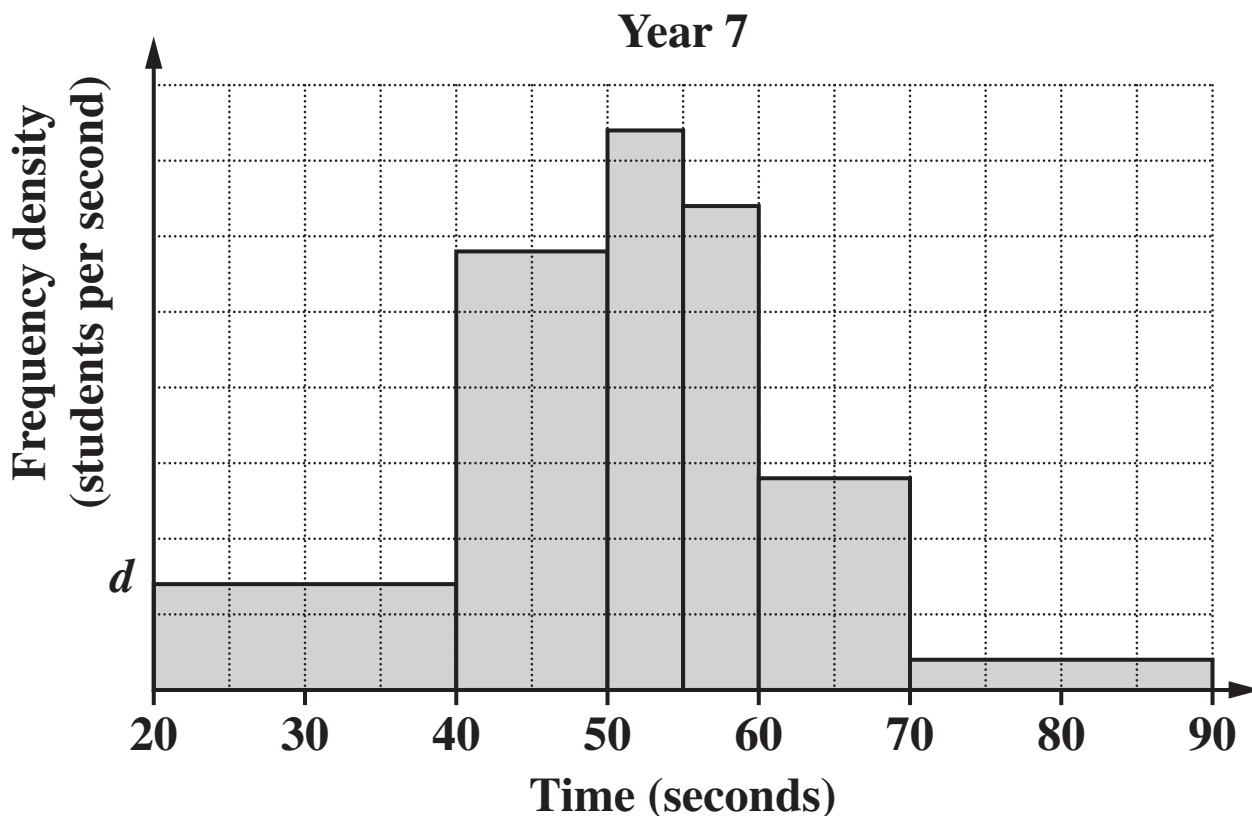
Write your answer in the form $a - b\sqrt{5}$ where a and b are integers.

[2 marks]

(c) _____

2 Students in Year 7 and Year 11 took part in a test to estimate fifty seconds.

(a) This histogram shows the distribution of the estimates for Year 7.

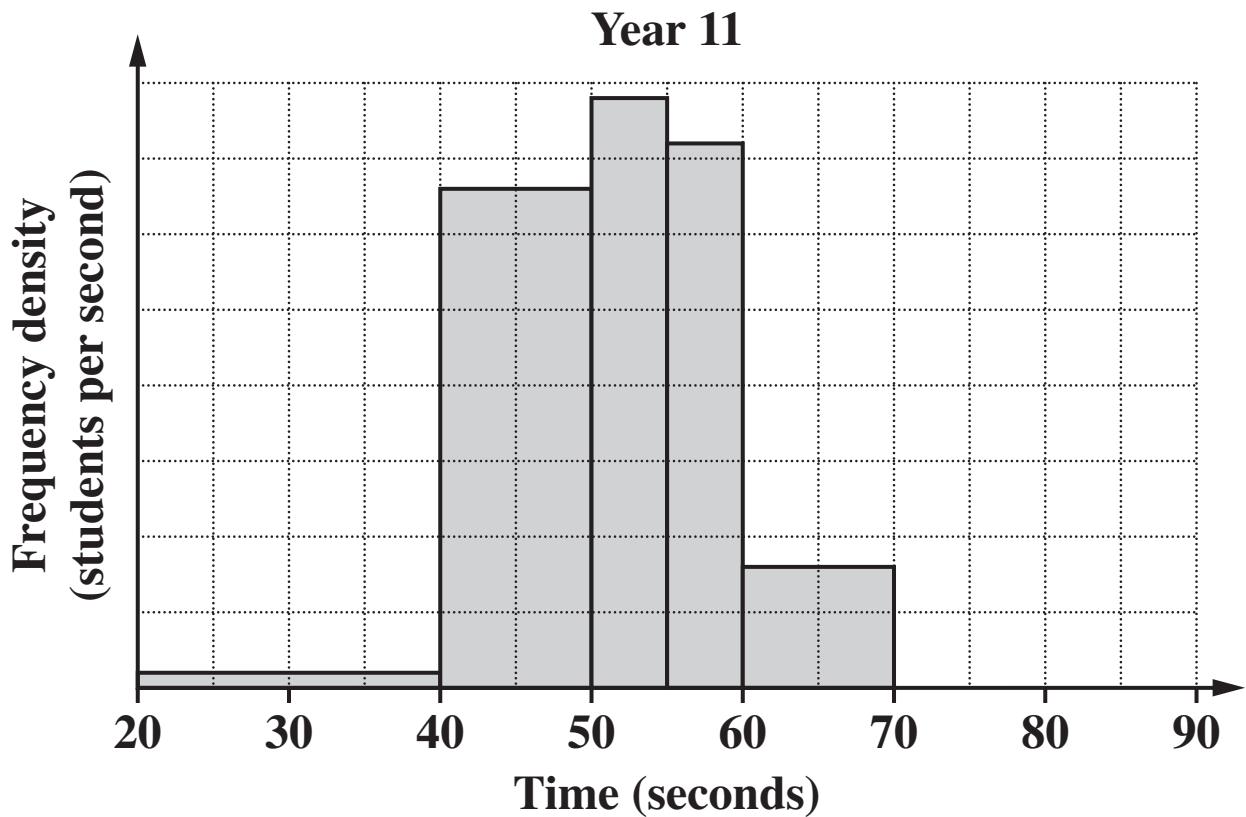


Key:
□ represents 5 students

Using the key, work out the frequency density, d , of the first group.
[1 mark]

(a) _____ students per second

(b) This histogram shows the distribution of the estimates for Year 11.



Key:
■ represents 5 students

Which year group were better at estimating fifty seconds?

Justify your answer with reference to the two distributions.

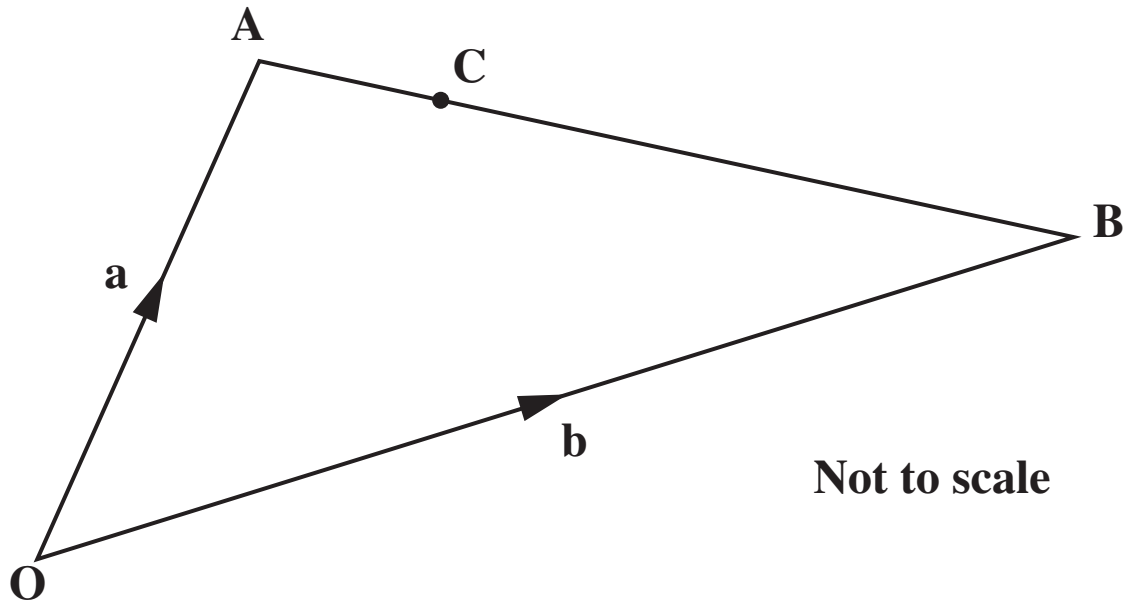
[1 mark]

Year = _____ because _____

3 **OAB** is a triangle.

C is the point on **AB** such that $AC = \frac{1}{4}AB$.

$\vec{OA} = \mathbf{a}$ and $\vec{OB} = \mathbf{b}$.



Find, in terms of \mathbf{a} and \mathbf{b} ,

(a) \vec{AB} ,
[1 mark]

(a) _____

(b) \vec{AC} ,
[1 mark]

(b) _____

(c) \vec{OC} .
[2 marks]

(c) _____

- 4 (a) By completing the square, express $x^2 - 8x + 10$ in the form $(x - a)^2 - b$.
[3 marks]

(a) _____

- (b) Hence state the minimum value of $x^2 - 8x + 10$.
[1 mark]

(b) _____

5 Solve, algebraically, these simultaneous equations.

$$y = 4 + x - x^2$$

$$3x + y = 7$$

[5 marks]

$$x = \underline{\hspace{2cm}} \quad y = \underline{\hspace{2cm}}$$

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- 6 A bag contains 6 red counters, 3 yellow counters and 1 blue counter.
Sandra picks two counters at random from the bag.
Neither counter is replaced in the bag.**

Calculate the probability that both counters are the same colour.

[4 marks]
