OCR
RECOGNISING ACHIEVEMENT

M10

GENERAL CERTIFICATE OF SECONDARY EDUCATION

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)

Monday 21 June 2010
Afternoon

Duration: 30 minutes

OCE/28396

B280A

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

MODIFIED LANGUAGE

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. Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).

INFORMATION FOR CANDIDATES

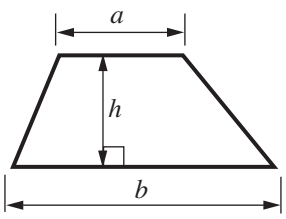
- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this Section is **25**.
- This document consists of **12** pages. Any blank pages are indicated.

WARNING

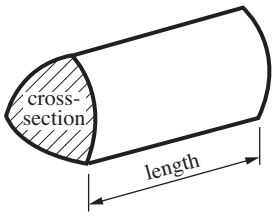
No calculator can be used for Section A of this paper

Formulae Sheet

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



Volume of prism = (area of cross-section) × length

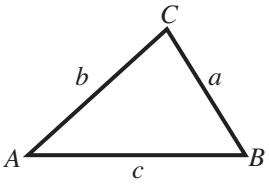


In any triangle ABC

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

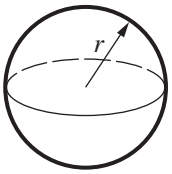
Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

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



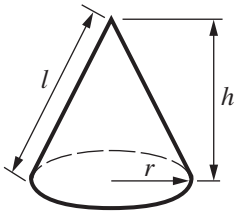
Volume of sphere = $\frac{4}{3}\pi r^3$

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 **(a)** Write $0\cdot\dot{7}\dot{3}$ as a fraction.

(a) ..... **[2]**

(b) Work out.

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

(b) ..... **[2]**

(c) Expand.

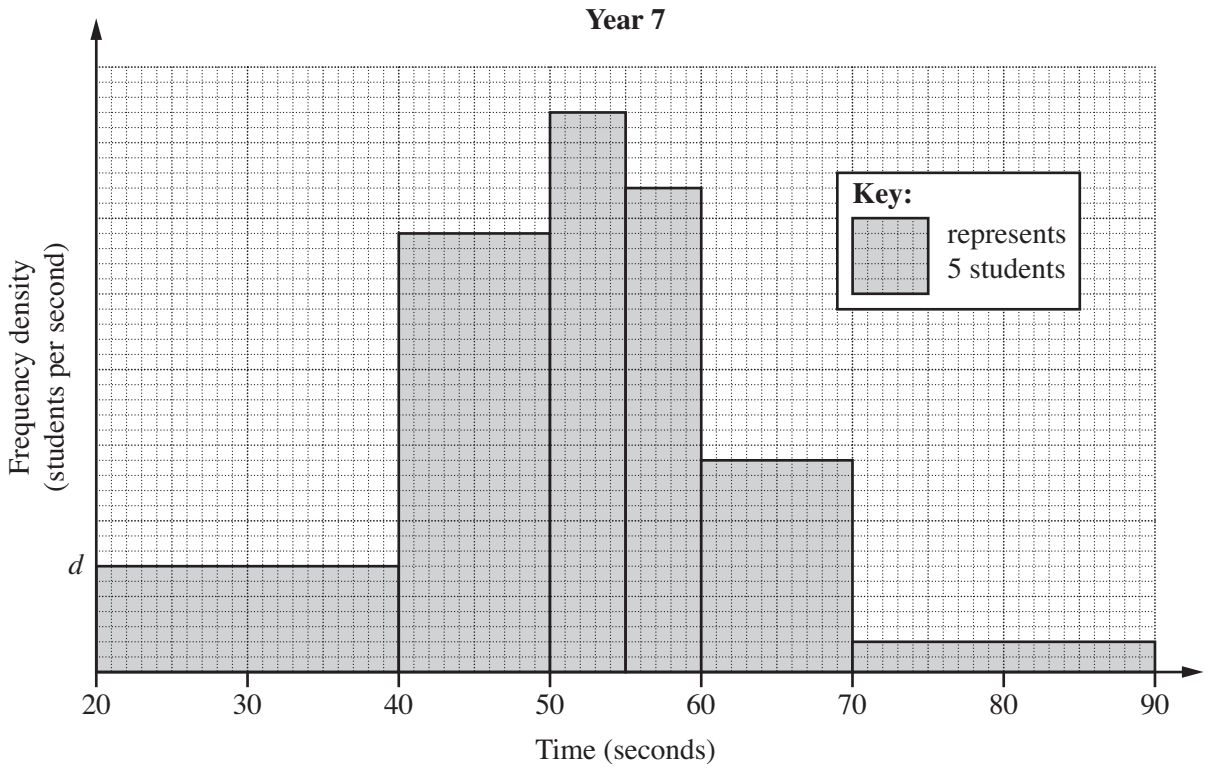
$$\left(\sqrt{5}-2\right)^2$$

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

(c) ..... **[2]**

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

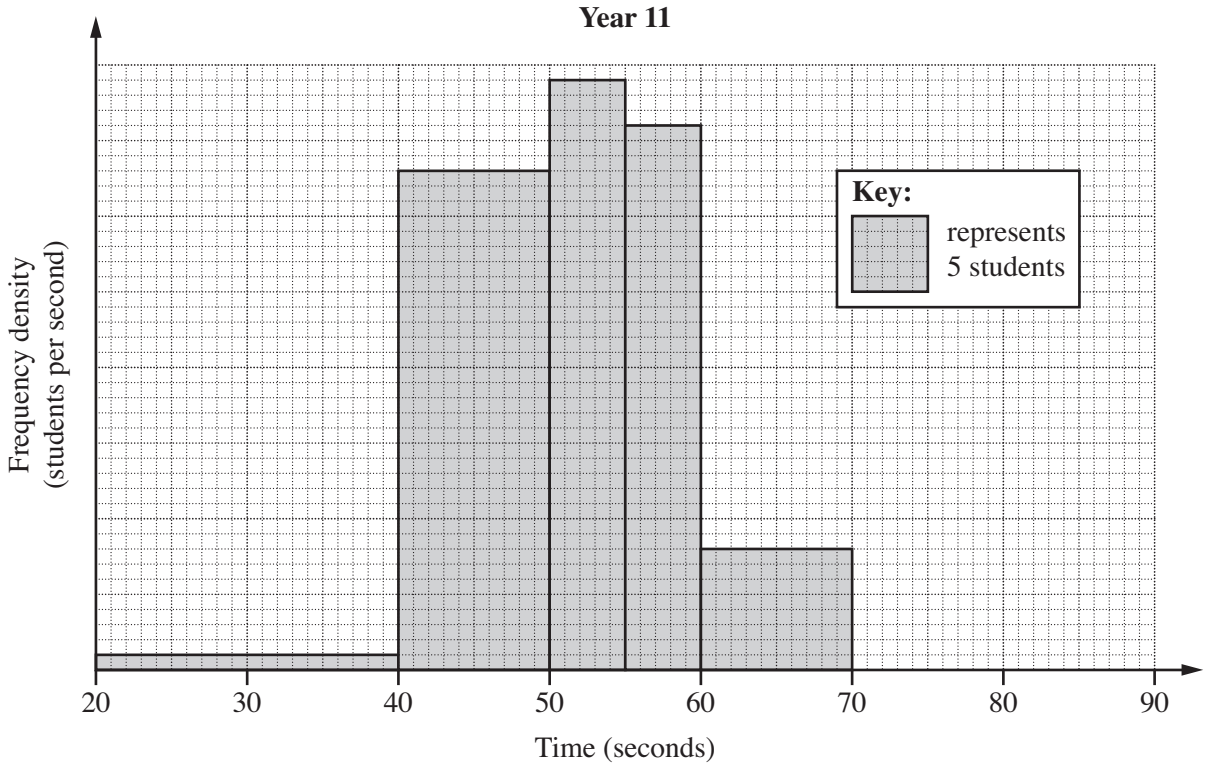
(a) This histogram shows the distribution of the estimates for Year 7.



Using the key, work out the frequency density, d, of the first group.

(a) ..... students per second **[1]**

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

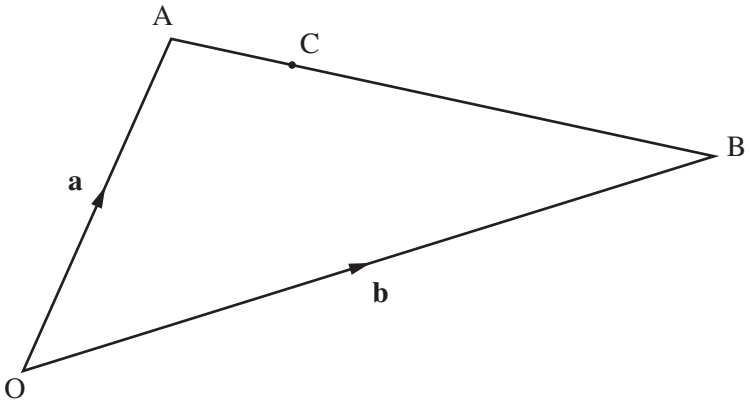


Which year group were better at estimating fifty seconds?
Justify your answer with reference to the two distributions.

Year = ... because .....

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

3 OAB is a triangle.
C is the point on AB such that $AC = \frac{1}{4}AB$.
$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$.



Not to scale

Find, in terms of **a** and **b**,

(a) $\overrightarrow{AB}$,

(a) ..... **[1]**

(b) $\overrightarrow{AC}$,

(b) ..... **[1]**

(c) $\overrightarrow{OC}$.

(c) ..... **[2]**

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

(a) ..... **[3]**

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

(b) ..... **[1]**

5 Solve, algebraically, these simultaneous equations.

$$y = 4 + x - x^2$$
$$3x + y = 7$$

x = ... y = ...

x = ... y = ...**[5]**

6 A bag contains 6 red counters, 3 yellow counters and 1 blue counter.
Sandra picks two counters at random from the bag.
She does not put the counters back in the bag.

Calculate the probability that both counters are the same colour.

..... **[4]**

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