



# M10

**GENERAL CERTIFICATE OF SECONDARY EDUCATION**  
**MATHEMATICS C (GRADUATED ASSESSMENT)**  
 MODULE M10 – SECTION A

## B280A

Candidates answer on the question paper.

**OCR supplied materials:**  
None

**Other materials required:**

- Geometrical instruments
- Tracing paper (optional)

**Thursday 20 January 2011**  
**Morning**

**Duration: 30 minutes**



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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**INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes above. 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.
- Do **not** write in the bar codes.

**INFORMATION FOR CANDIDATES**

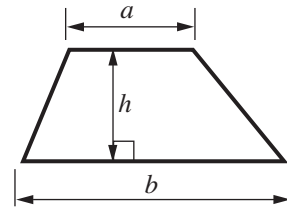
- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this Section is **25**.
- This document consists of **8** pages. Any blank pages are indicated.

**WARNING**

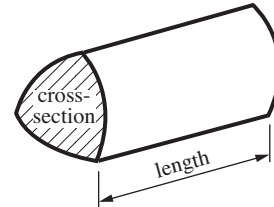
**No calculator can be used for Section A of this paper**

## Formulae Sheet

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



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

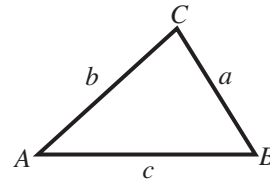


**In any triangle  $ABC$**

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

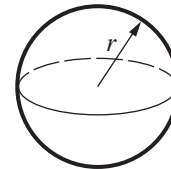
**Cosine rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

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



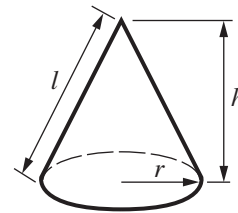
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

**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

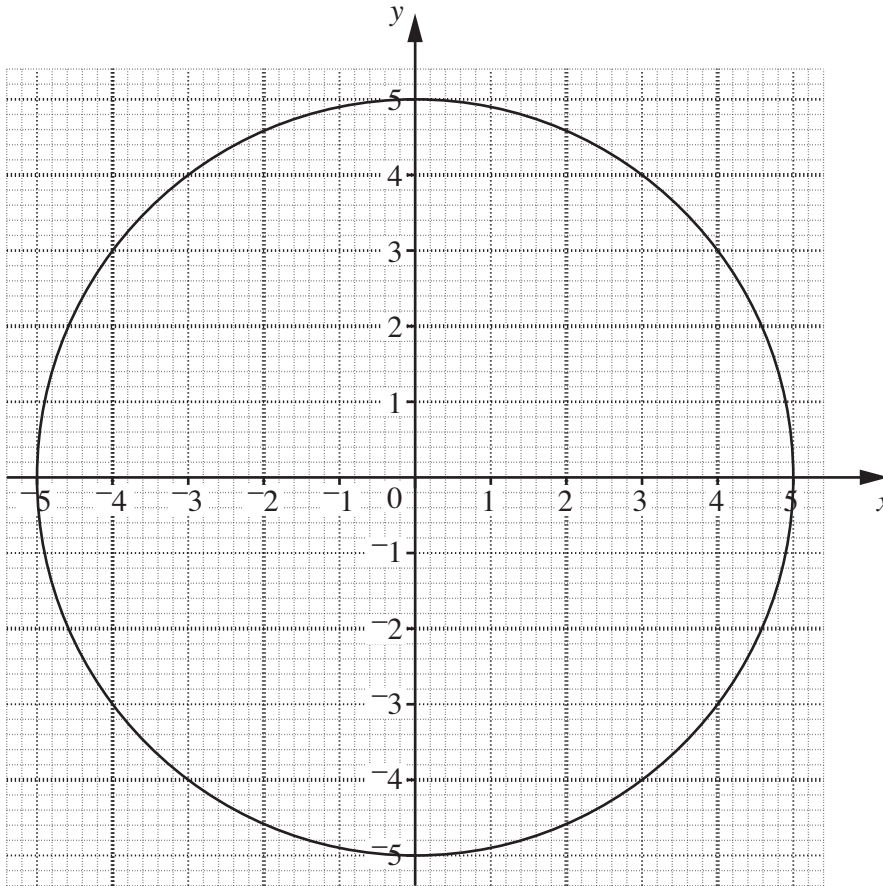
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**PLEASE DO NOT WRITE ON THIS PAGE**

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(a) The equation of this circle is  $x^2 + y^2 = a^2$ .

Write down the value of  $a$ .

(a) ..... [1]

(b) Find **graphically** the coordinates of the points of intersection of this circle with the line  $y = 2x - 1$ .

(b) (..... , .....) and (..... , .....) [3]

- 2 (a) Write as a single fraction, giving your answer as simply as possible.

$$\frac{5}{x+2} - \frac{3}{x}$$

(a) ..... [3]

- (b) (i) Write  $x^2 - 12x + 40$  in the form  $(x - a)^2 + b$ .

(b)(i) ..... [3]

- (ii) Hence state the coordinates of the point on the curve  $y = x^2 - 12x + 40$  for which  $y$  is a minimum.

(ii)(..... , .....) [2]

- 3 (a) Convert  $0.\dot{1}0\dot{2}$  to a fraction.  
Give your answer in its simplest terms.

(a) ..... [3]

- (b) Simplify.

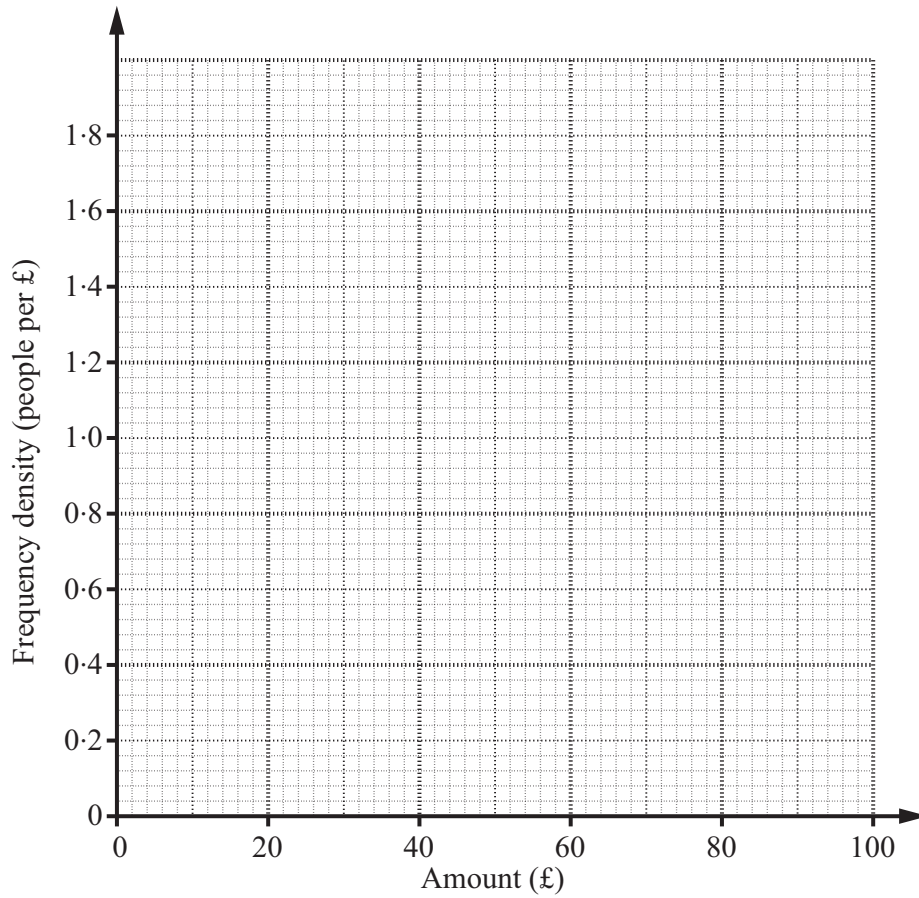
$$\frac{\sqrt{90}}{3\sqrt{2}}$$

(b) ..... [2]

4 This table summarises the amounts of money collected by 100 boys in a sponsored charity event.

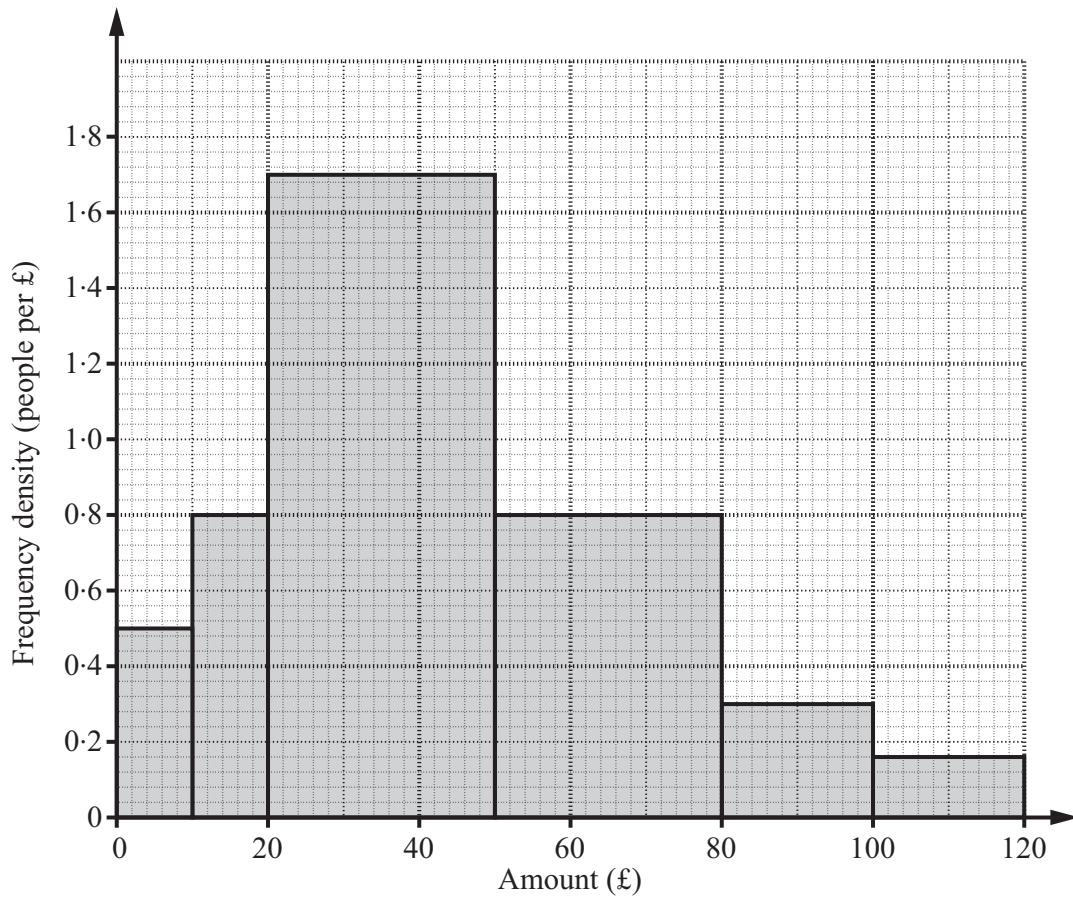
Amount (£ $a$ )	Frequency
$0 < a \leq 10$	5
$10 < a \leq 20$	12
$20 < a \leq 50$	48
$50 < a \leq 80$	27
$80 < a \leq 100$	8

(a) Draw a histogram to represent this distribution.



[3]

This histogram represents the distribution for the money collected by 100 girls in the same event.



(b) Write one difference and one similarity between the distributions for the boys and the girls.

Difference .....

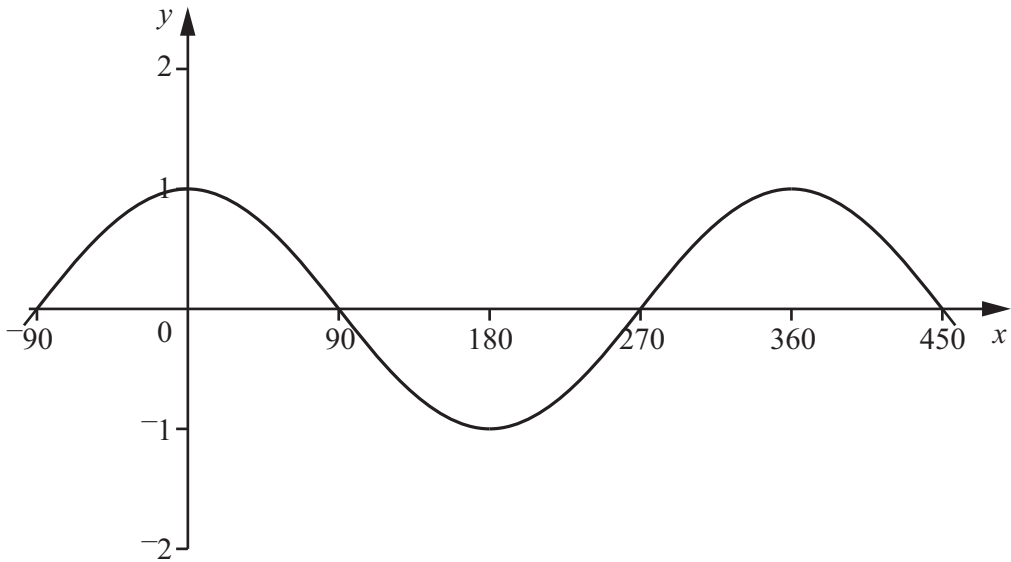
.....

Similarity .....

..... [2]

**TURN OVER FOR QUESTION 5**

5



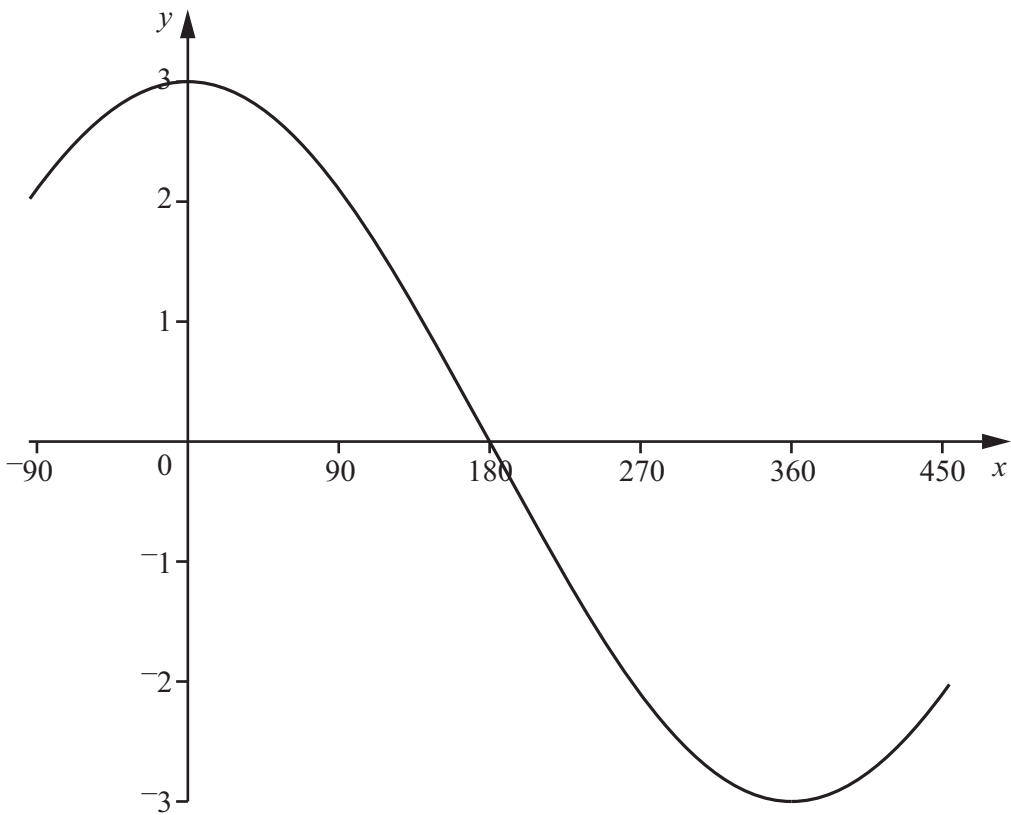
The graph above is a sketch of  $y = \cos x^\circ$ .

(a) On the axes above, sketch the graph of  $y = \cos x^\circ + 1$ .

[1]

(b) The graph below is a sketch of  $y = a \cos bx^\circ$ .

State the values of  $a$  and  $b$ .



(b)  $a = \dots\dots\dots$   $b = \dots\dots\dots$  [2]