

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**

**THURSDAY 20 JANUARY 2011: Morning**

**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**

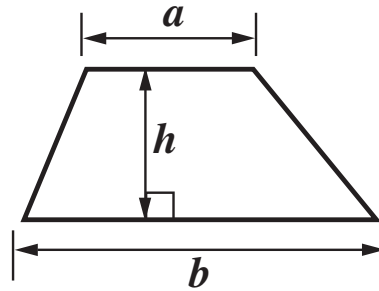
- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Read each question carefully. Make sure you know what you have to do before starting your answer.**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

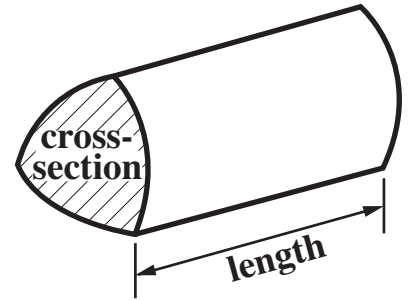
- **The number of marks is given in brackets [ ] at the end of each question or part question.**
- **The total number of marks for this Section is 25.**

## FORMULAE SHEET

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



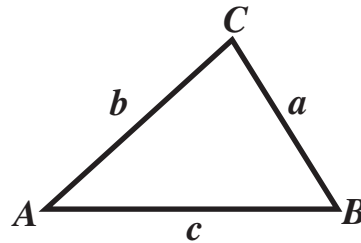
Volume of prism = (area of cross-section)  $\times$  length



In any triangle  $ABC$

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

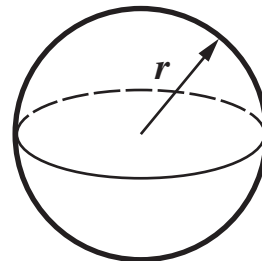
Cosine rule  $a^2 = b^2 + c^2 - 2bc \cos A$



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

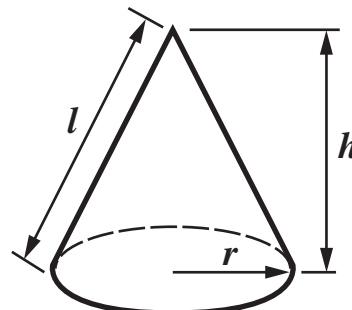
Volume of sphere =  $\frac{4}{3}\pi r^3$

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



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

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



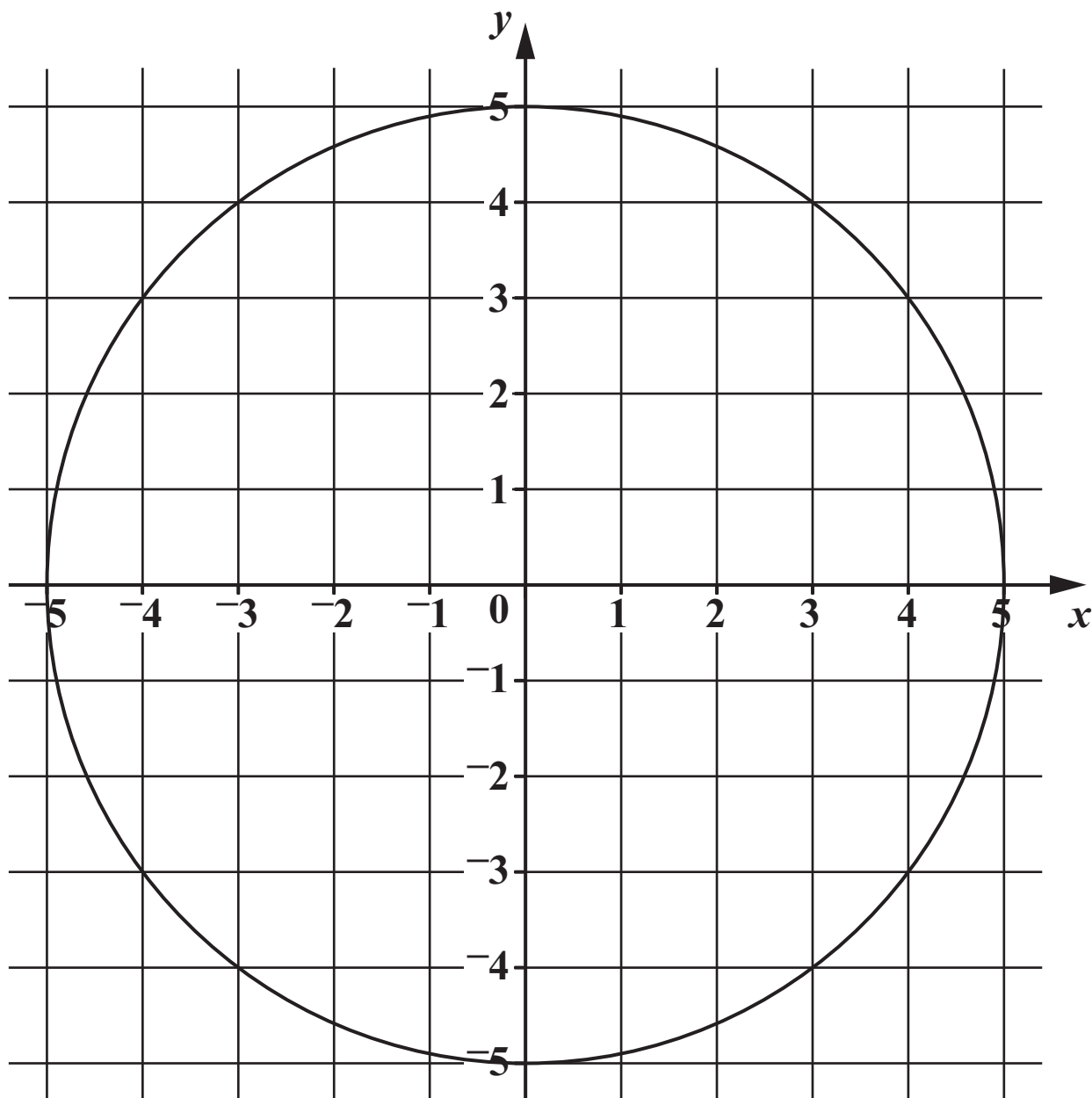
The Quadratic Equation

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) 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]**



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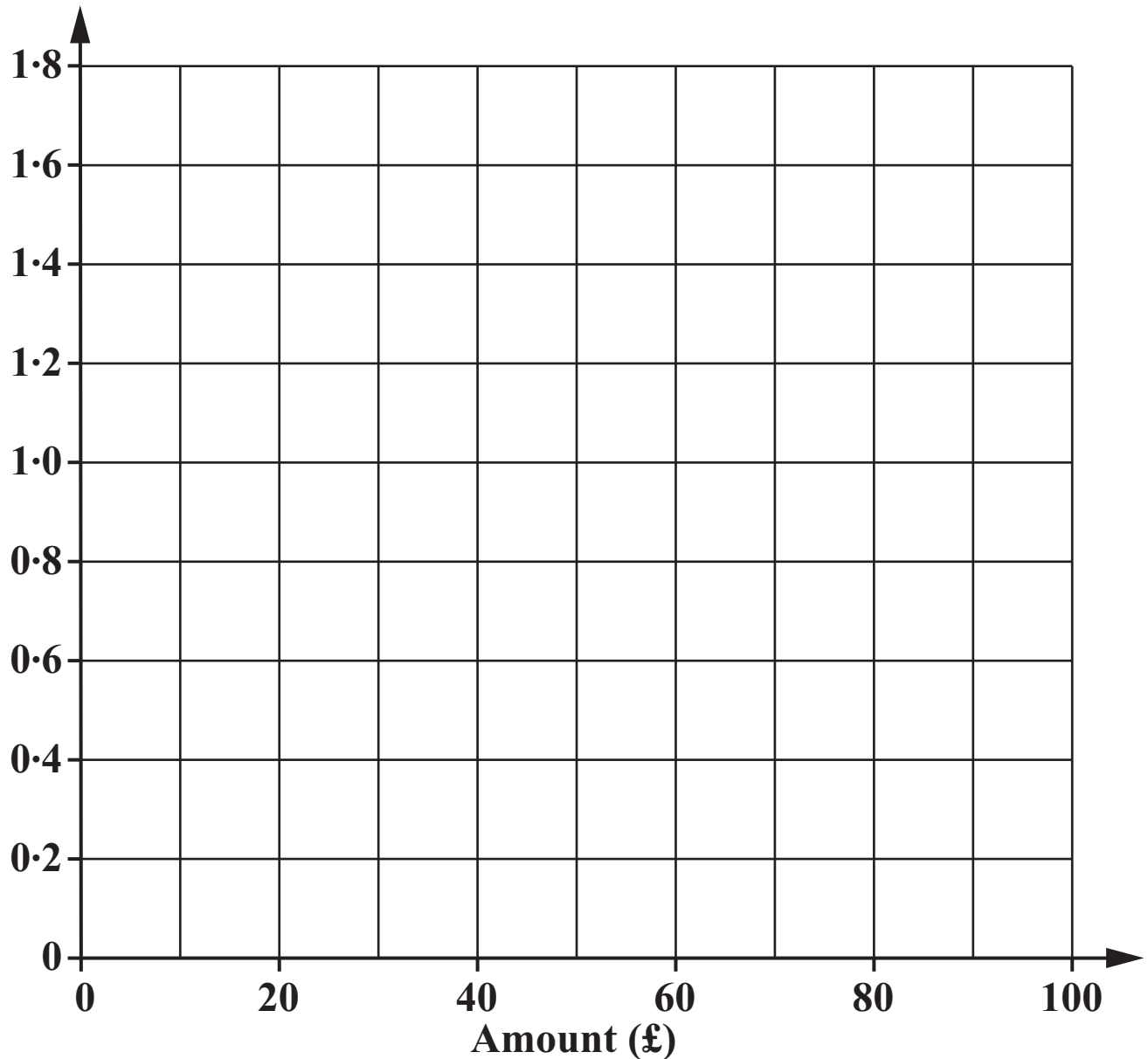
**TURN OVER FOR QUESTION 4**

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

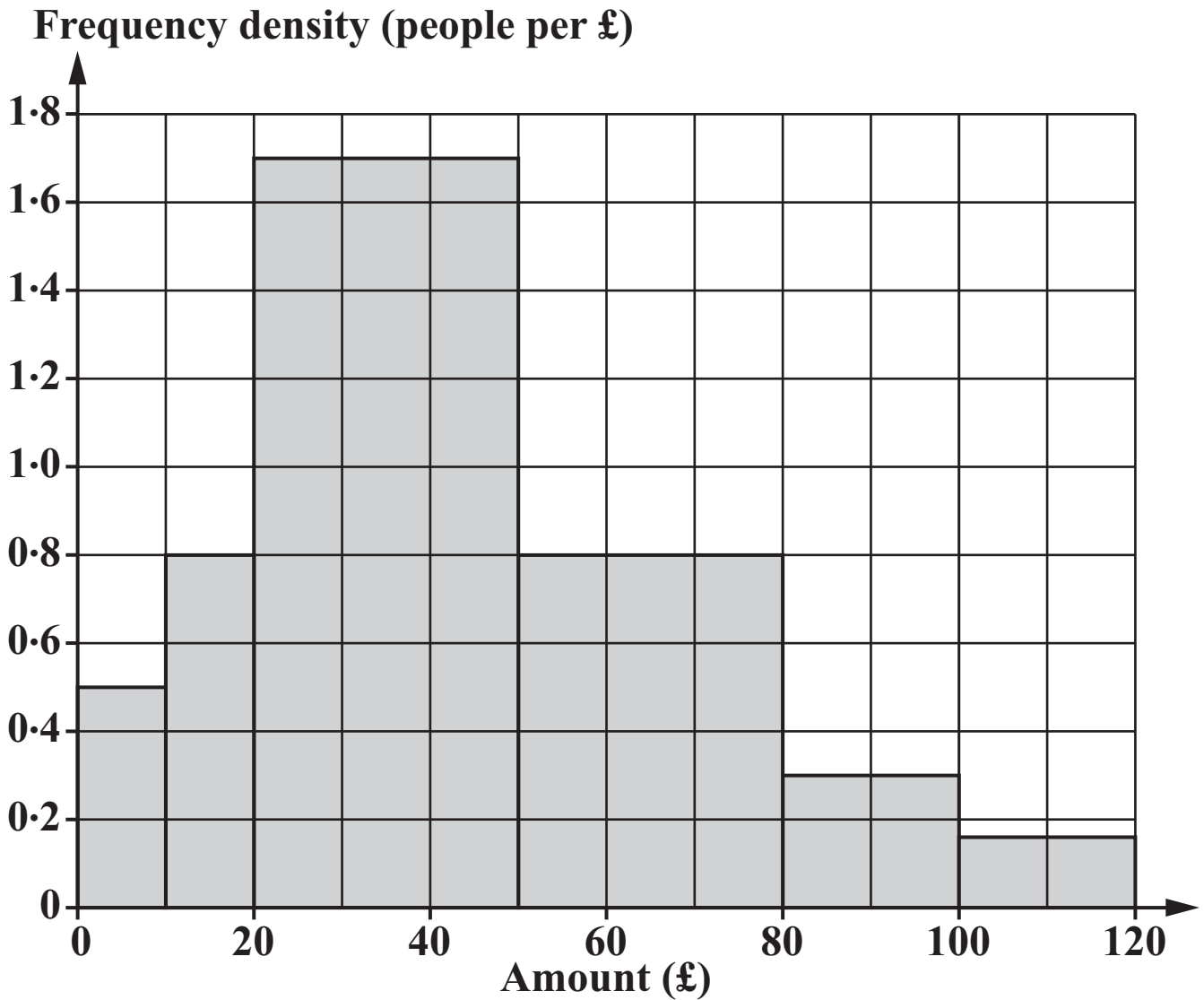
Amount (£ $a$ )	Frequency
$0 < a \leq 10$	5
$10 < a \leq 20$	12
$20 < a \leq 50$	48
$50 < a \leq 80$	27
$80 < a \leq 100$	8

(a) Draw a histogram to represent this distribution.

Frequency density (people per £)



**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** \_\_\_\_\_

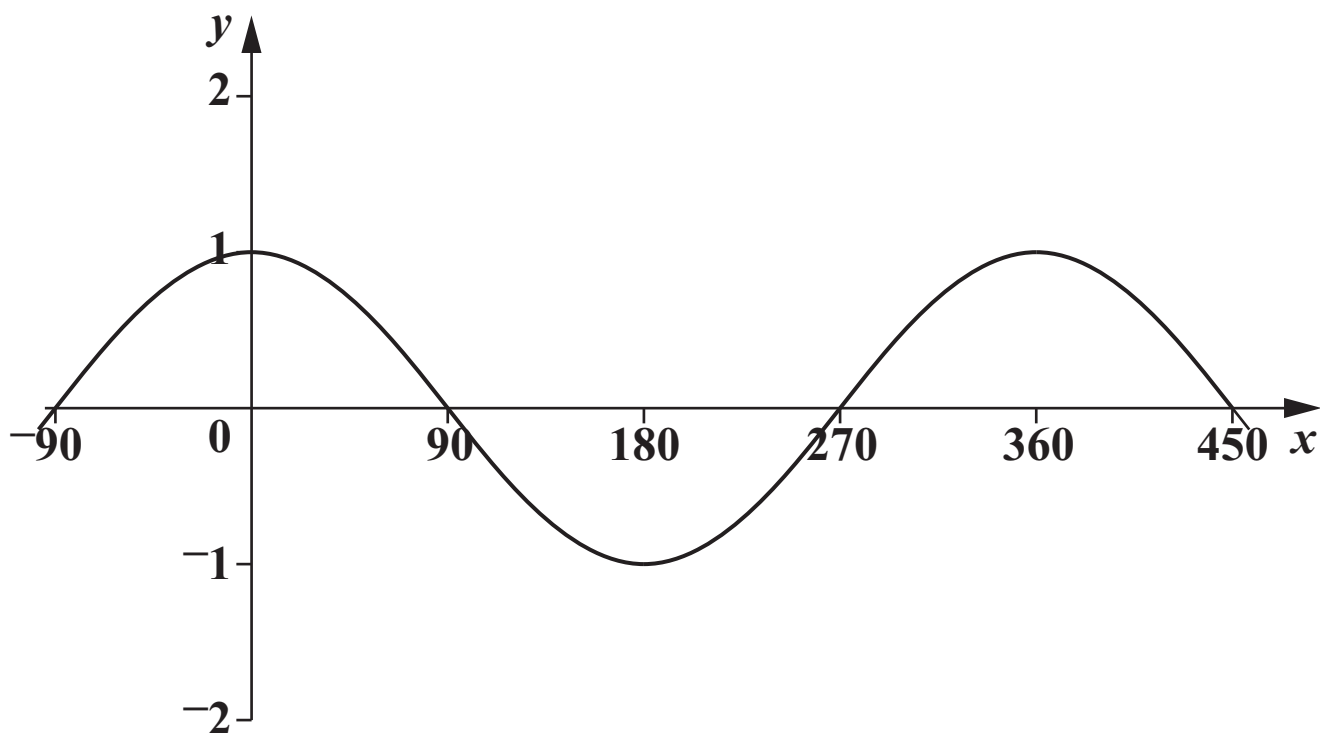
\_\_\_\_\_

**Similarity** \_\_\_\_\_

\_\_\_\_\_

**[2]**

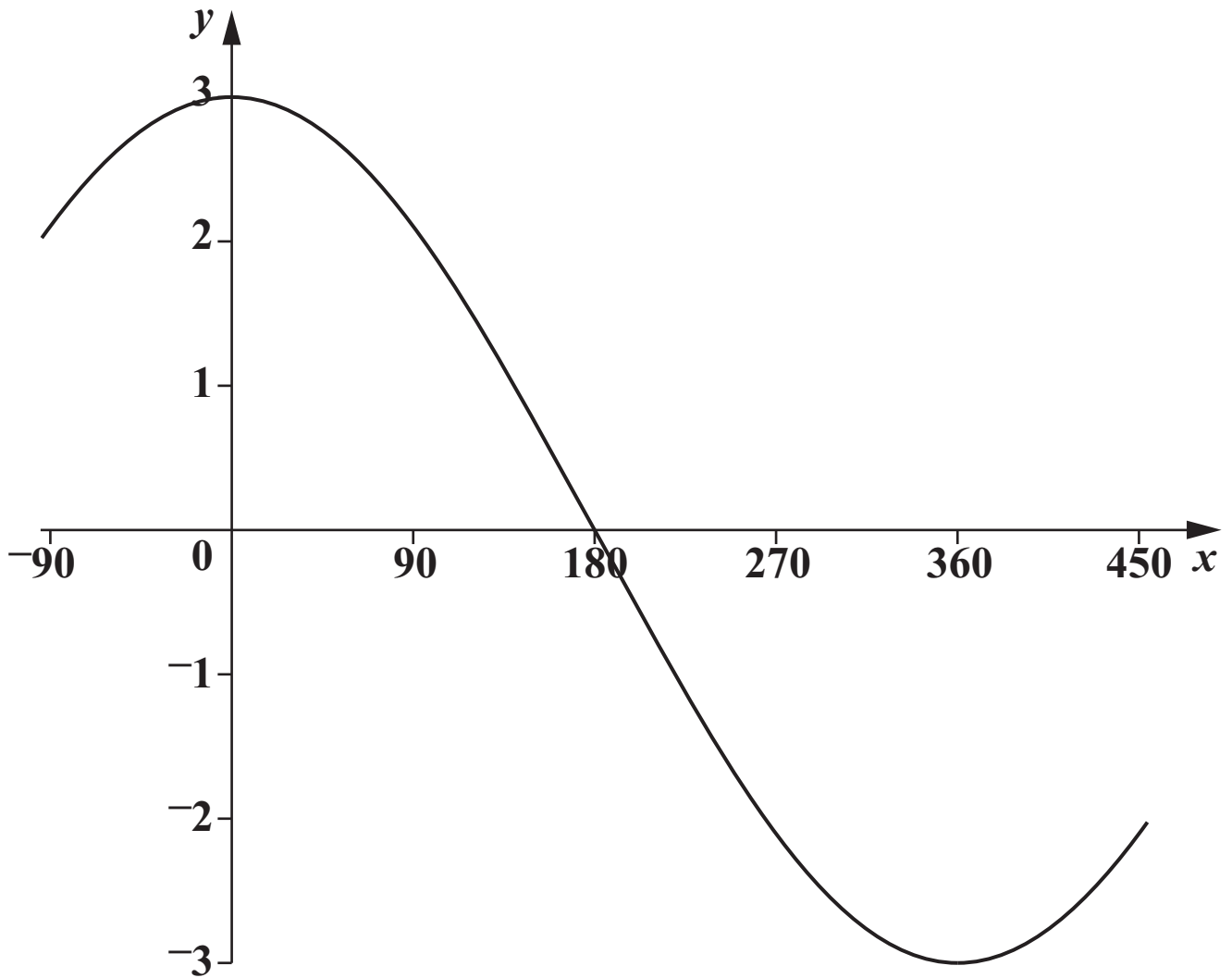
**5** The graph below is a sketch of  $y = \cos x^\circ$ .



**(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)  $a =$  \_\_\_\_\_  $b =$  \_\_\_\_\_ [2]

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