OCR
RECOGNISING ACHIEVEMENT

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GENERAL CERTIFICATE OF SECONDARY EDUCATION **B263A**

MATHEMATICS B (MEI)

Paper 1 Section A (Higher Tier)

THURSDAY 10 JANUARY 2008 Morning

Time: 45 minutes

Candidates answer on the question paper
Additional materials: Geometrical instruments
Tracing paper (optional)

CUP/T42672

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or 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.
- Do **not** write outside the box bordering each page.
- Write your answer to each question in the space provided.

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 **36**.

WARNING

You are not allowed to use a calculator in Section A of this paper.

FOR EXAMINER'S USE	
SECTION A	
SECTION B	
TOTAL	

This document consists of **11** printed pages and **1** blank page.

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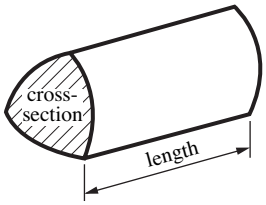
Formulae Sheet: Higher Tier

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

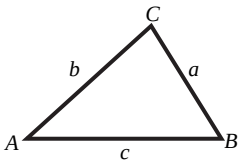


In any triangle *ABC*

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

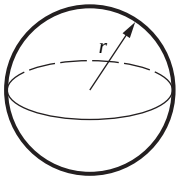
Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

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



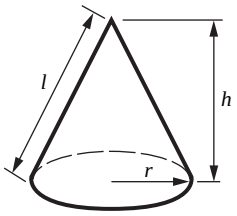
Volume of sphere = $\frac{4}{3}\pi r^3$

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

Second hand cars Pay 20 % deposit Then the balance in 12 equal payments

Clive bought a car for £3000.

How much was each of the 12 payments?

£ .....[5]

2 **(a)** Solve this equation.

$$3x = x + 7$$

(a).....[2]

(b) Simplify the following.

(i) $a^3 \times a^4$

(b)(i).....[1]

(ii) $\frac{b^6}{b^2}$

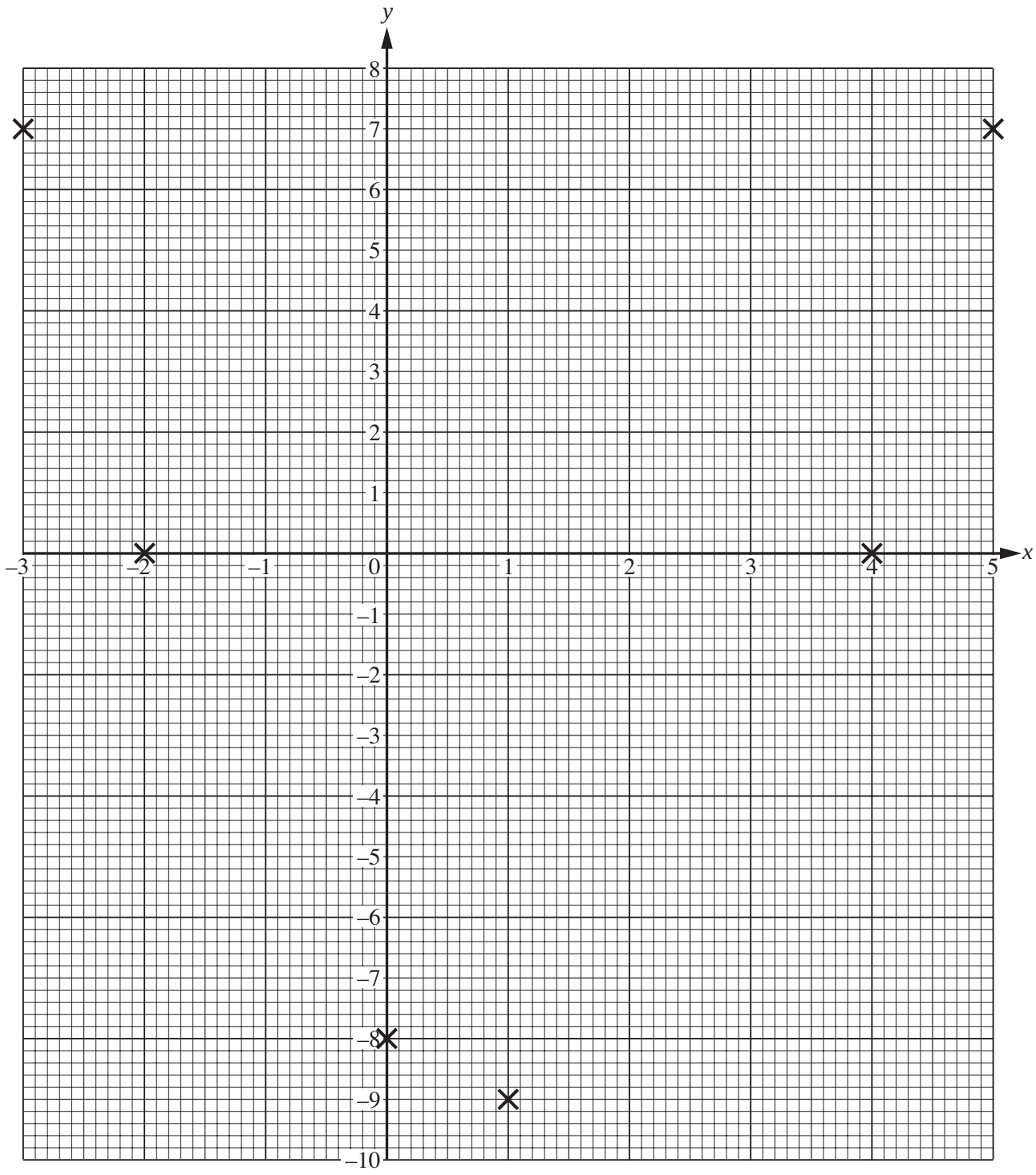
(ii) .....[1]

3 **(a)** Complete the table of values for $y = x^2 - 2x - 8$.

x	–3	–2	–1	0	1	2	3	4	5
y	7	0		–8	–9			0	7

[2]

(b) On the grid opposite draw the graph of $y = x^2 - 2x - 8$ for values of x from –3 to 5.

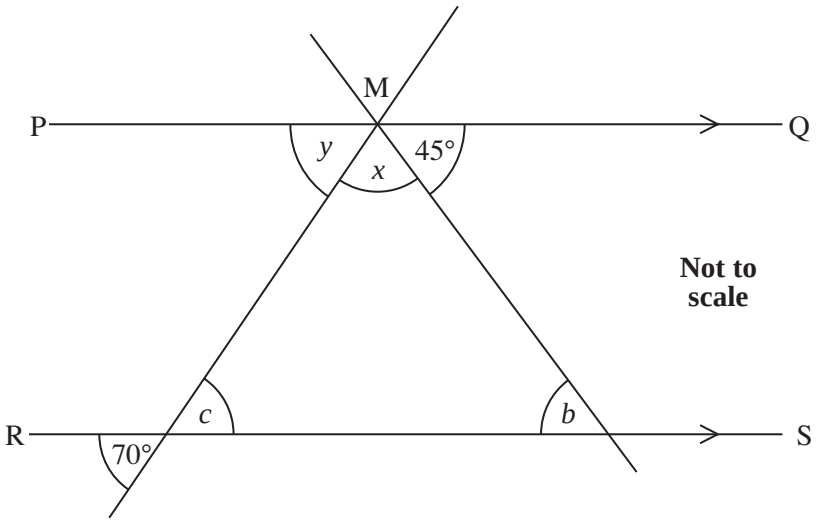


[2]

(c) Use your graph to find the values of x for which $x^2 - 2x - 8 = 2$.

(c) ..... and .....[2]

4 In the diagram the lines PMQ and RS are parallel.
They are crossed by two straight lines which intersect at M.



Mary and Neil were each asked to find the size of angle *x*.

(a) Here is Mary's method.

Complete her reasons.

y = 70°. Reason : y and 70° are .....

x =180° – 45° - 70° = 65°. Reason : .....

..... [2]

(b) Here is Neil's method.

Complete his reasons.

b = 45°. Reason : b and 45° are .....

c = 70°. Reason : c and 70° are .....

x = 180° – 45° - 70° = 65°. Reason : .....

..... [3]

5 Work out.

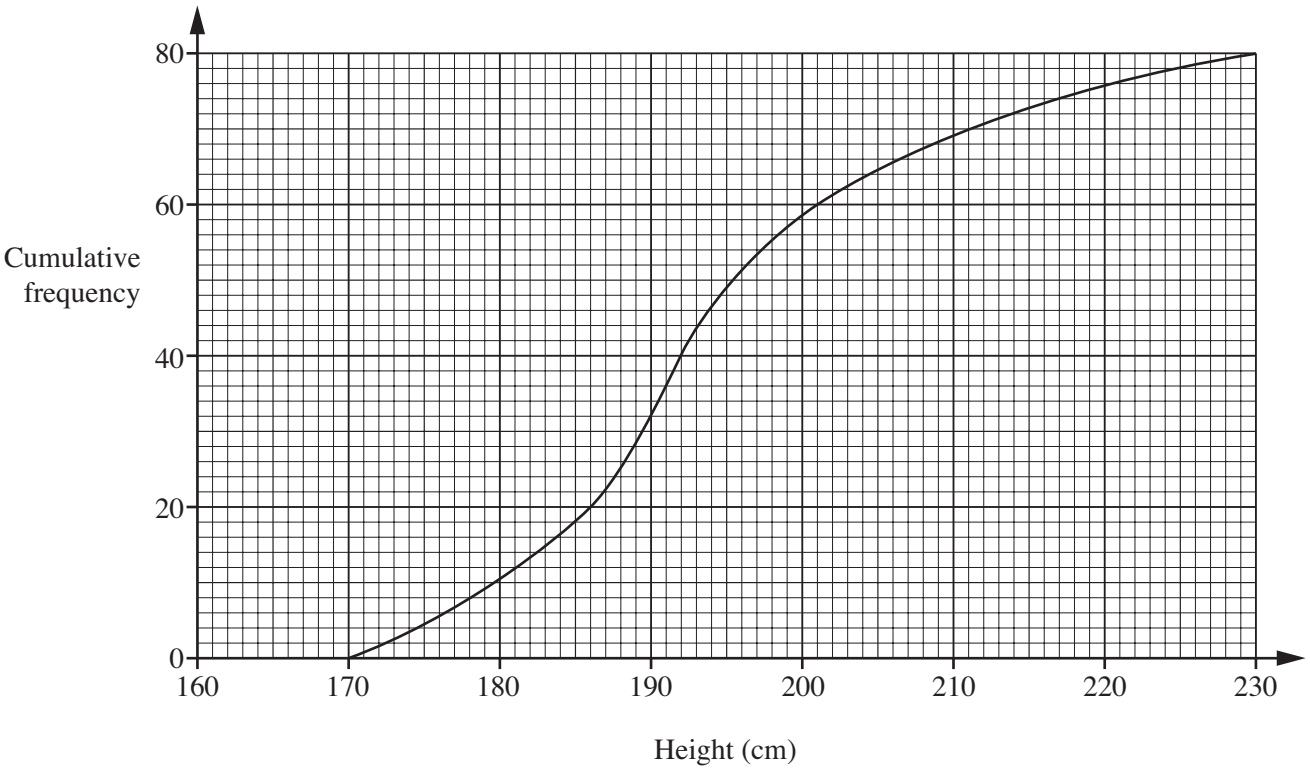
(a) $3\frac{3}{4}+1\frac{5}{6}$

(a).....[3]

(b) $2\frac{5}{8}\times 2\frac{2}{3}$

(b) .....[3]

6 This cumulative frequency curve summarises the heights of 80 sunflowers.



For the heights of these sunflowers find

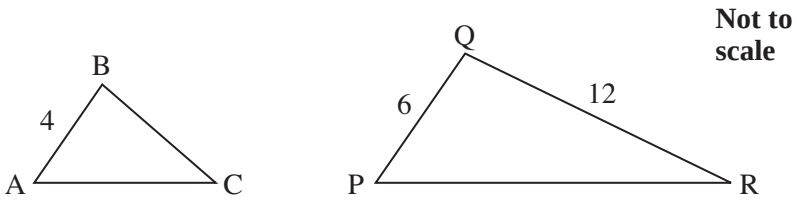
(a) the median,

(a)..... cm [1]

(b) the interquartile range.

(b) ..... cm [2]

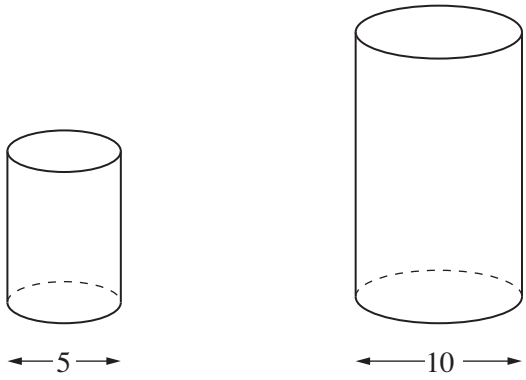
7 **(a)** Triangles ABC and PQR are mathematically similar.
AB = 4 cm, PQ = 6 cm and QR = 12 cm.



Find the length BC.

(a)..... cm [2]

(b) The diagram shows two mathematically similar cylinders.
The diameter of the smaller cylinder is 5 cm.
The diameter of the larger cylinder is 10 cm.



Given that the volume of the smaller cylinder is 100 cm^3, calculate the volume of the larger cylinder.

(b) .....cm^3 [2]

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8 Given that $x^2 + 12x + a = (x + b)^2$, find the value of a and of b.

$a =$ .....

$b =$ .....[3]

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