



Rewarding Learning

ADVANCED SUBSIDIARY (AS)  
General Certificate of Education  
2023

Centre Number

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Candidate Number

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# Mathematics

Assessment Unit AS 1

*assessing*

Pure Mathematics

<b>MV18</b>
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[SMT11]

**THURSDAY 18 MAY, AFTERNOON**

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## Time

1 hour 45 minutes, plus your additional time allowance.

## Instructions to Candidates

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer **all nine** questions in the spaces provided.

**Do not write on blank pages.**

Complete in black ink only.

Questions which require drawing or sketching should be completed using an HB pencil.

All working should be clearly shown in the spaces provided.

Marks may be awarded for partially correct solutions.

**Answers without working may not gain full credit.**

Answers should be given to three significant figures unless otherwise stated.

**You are permitted to use a graphic or scientific calculator in this paper.**

## Information for Candidates

The total mark for this paper is 100.

Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

A copy of the **Mathematical Formulae and Tables booklet** is provided.

Throughout the paper the logarithmic notation used is  $\ln z$  where it is noted that  $\ln z \equiv \log_e z$

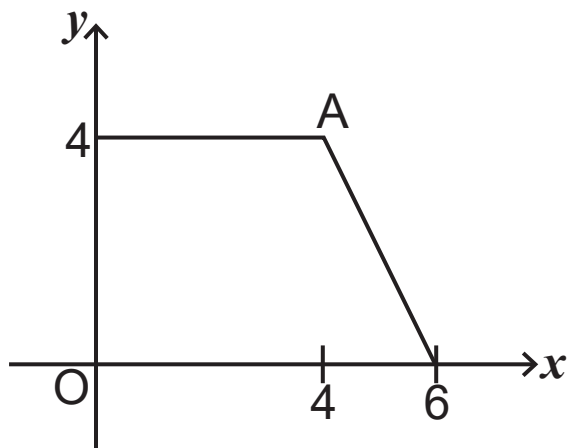






2 **Fig. 1** below shows a sketch of the graph of the function  $y = f(x)$ .

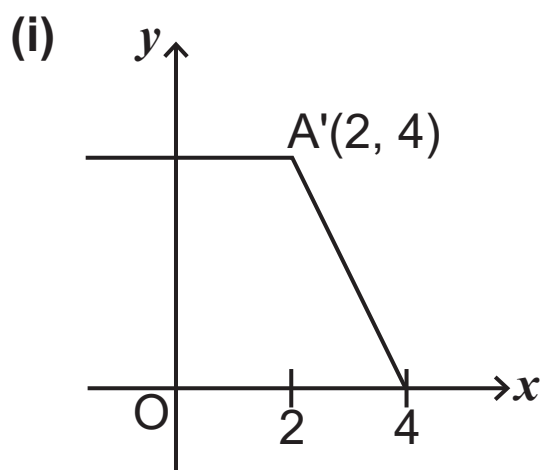
**Fig. 1**



Point A has coordinates (4, 4).

Each of the following sketches shows a single transformation of the function  $y = f(x)$ .

For each sketch, use function notation to describe the transformation shown. [2 marks for each]



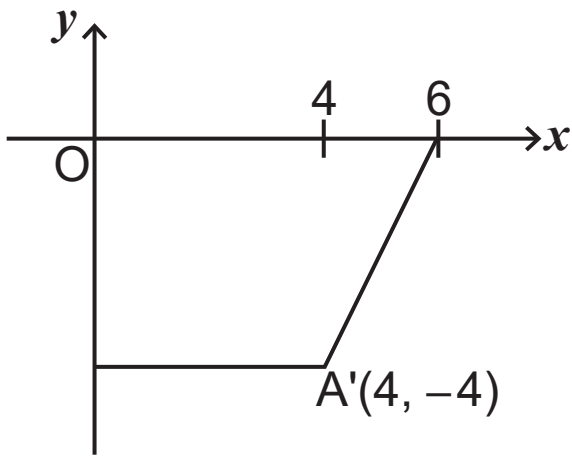
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(ii)



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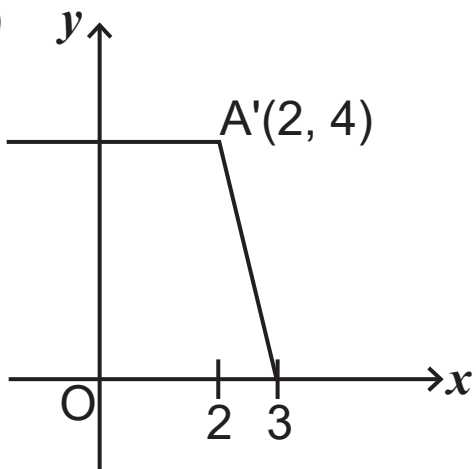
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(iii)



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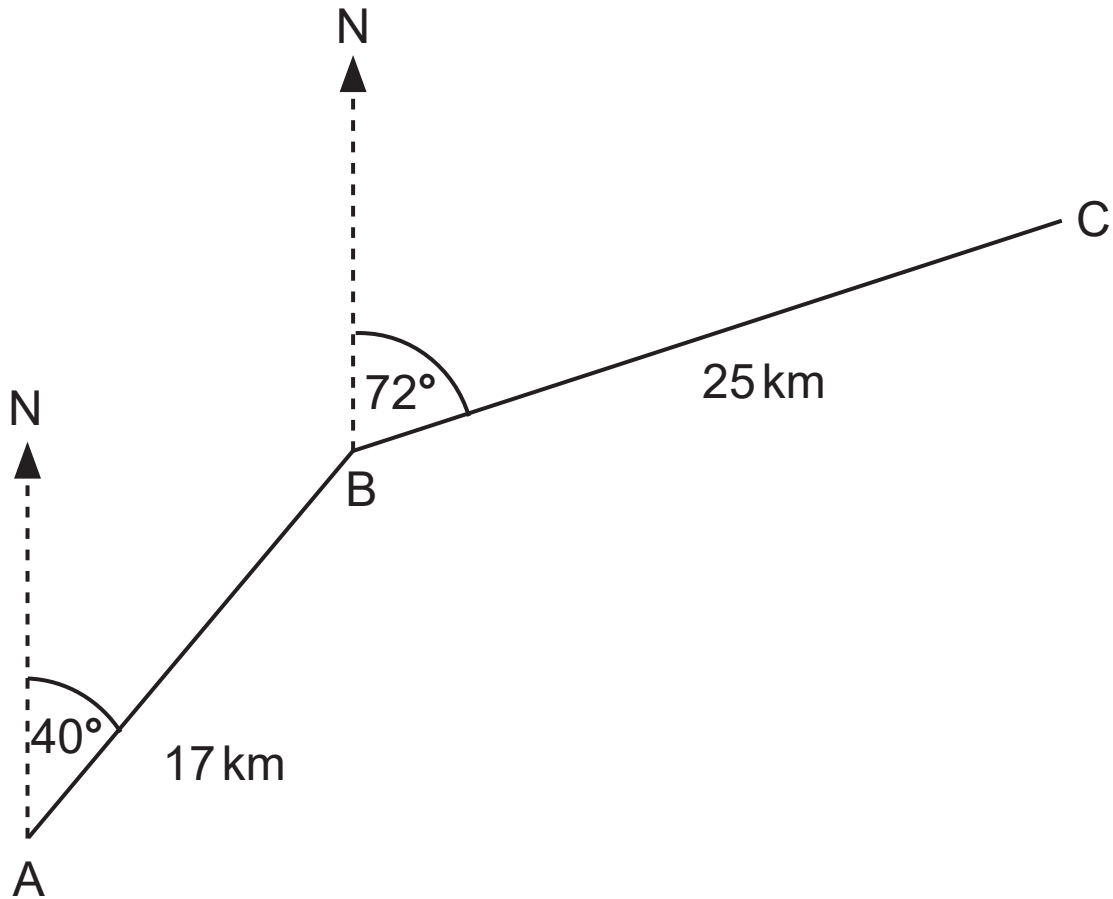
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- 5 (a) The positions of three towns, A, B and C, are shown in Fig. 3 below.

Fig. 3



$AB = 17 \text{ km}$

B is on a bearing of  $040^\circ$  from A.

$BC = 25 \text{ km}$

C is on a bearing of  $072^\circ$  from B.

- (i) Find the obtuse angle  $\hat{A}BC$ . [1 mark]

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**(ii)** Find the area of the triangle ABC. [2 marks]

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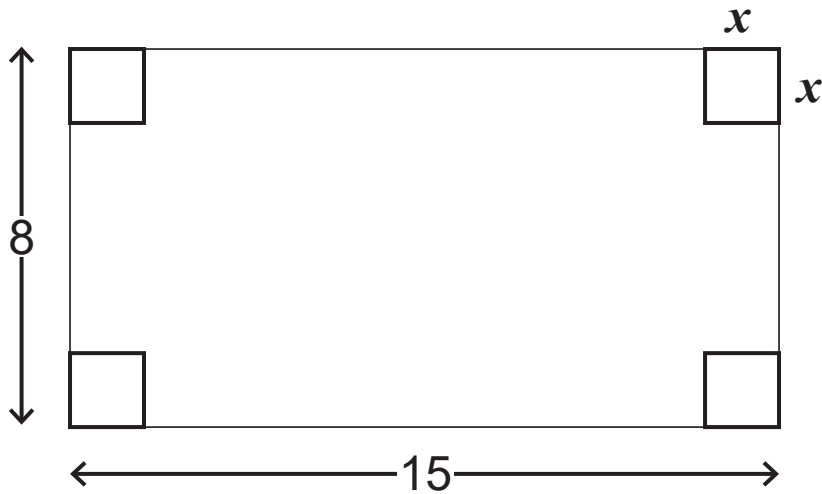






7 (a) A rectangular sheet of metal is shown in **Fig. 4** below.

**Fig. 4**



The sheet has length 15 units and width 8 units.

Four squares, each of length  $x$  units, are cut from the corners of the sheet.

An open box is then formed by folding up the edges.

(i) Show that the volume of the box is given by  
[3 marks]

$$V = 4x^3 - 46x^2 + 120x$$

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## SOURCES

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For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
<b>Total Marks</b>	

Examiner Number

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