

MATHEMATICS PAPER 1
Question-Answer Book

8.30 am – 10.30 am (2 hours)

This paper must be answered in English

- Write your Candidate Number, Centre Number and Seat Number in the spaces provided on this cover.
- This paper consists of THREE sections, A(1), A(2) and B. Each section carries 33 marks.
- Attempt ALL questions in Sections A(1) and A(2), and any THREE questions in Section B. Write your answers in the spaces provided in this Question-Answer Book. Supplementary answer sheets will be supplied on request. Write your Candidate Number on each sheet and fasten them with string inside this book.
- Write the question numbers of the questions you have attempted in Section B in the spaces provided on this cover.
- Unless otherwise specified, all working must be clearly shown.
- Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
- The diagrams in this paper are not necessarily drawn to scale.

Candidate Number									
Centre Number									
Seat Number									

	Marker's Use Only	Examiner's Use Only
	Marker No.	Examiner No.
Section A Question No.	Marks	Marks
1-3		
4-5		
6-7		
8		
9		
10		
11		
12		
13		
Section A Total		

Checker's Use Only	Section A Total		
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Section B Question No.*	Marks	Marks
Section B Total		

**To be filled in by the candidate.*

Checker's Use Only	Section B Total		
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Checker No.	
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FORMULAS FOR REFERENCE

SPHERE	Surface area	$= 4\pi r^2$
	Volume	$= \frac{4}{3}\pi r^3$
CYLINDER	Area of curved surface	$= 2\pi rh$
	Volume	$= \pi r^2 h$
CONE	Area of curved surface	$= \pi rl$
	Volume	$= \frac{1}{3}\pi r^2 h$
PRISM	Volume	$= \text{base area} \times \text{height}$
PYRAMID	Volume	$= \frac{1}{3} \times \text{base area} \times \text{height}$

SECTION A(1) (33 marks)**Answer ALL questions in this section and write your answers in the spaces provided.**

1. Make a the subject of the formula $P = ab + 2bc + 3ac$. (3 marks)

2. Simplify $\frac{(x^3y)^2}{y^5}$ and express your answer with positive indices. (3 marks)

3. Factorize

(a) $4x^2 - 4xy + y^2$,

(b) $4x^2 - 4xy + y^2 - 2x + y$.

(3 marks)

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11.

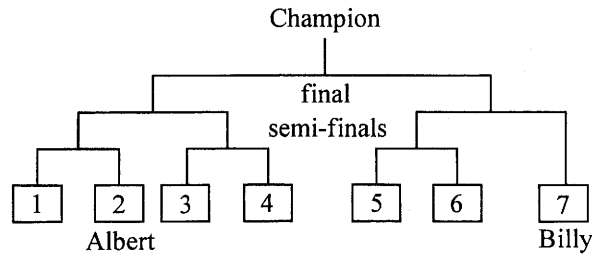


Figure 3

Seven players take part in a men's singles tennis knock-out tournament. They are randomly assigned to the positions 1, 2, 3, 4, 5, 6 and 7. It is known that Albert and Billy are in positions 2 and 7 respectively. The winner of each game proceeds to the next round as shown in Figure 3 and the loser is knocked out. Billy goes straight to the semi-finals. In each game, each player has an equal chance of beating his opponent.

- (a) Write down the probability that Albert will reach the semi-finals. (1 mark)

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- (b) Find the probability that Albert will be the champion. (2 marks)

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- (c) Find the probability that Albert will fail to reach the final. (3 marks)

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- (d) Find the probability that Albert will play against Billy in the final. (2 marks)

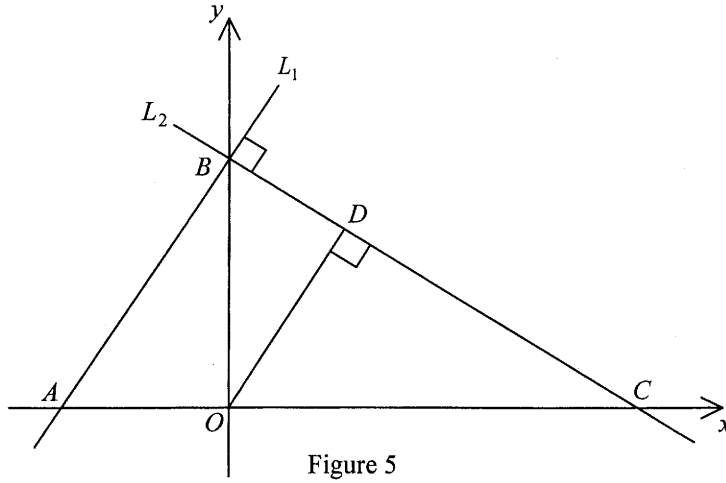
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13. In Figure 5, the straight line $L_1 : 2x - y + 4 = 0$ cuts the x -axis and the y -axis at A and B respectively. The straight line L_2 , passing through B and perpendicular to L_1 , cuts the x -axis at C . From the origin O , a straight line perpendicular to L_2 is drawn to meet L_2 at D .



- (a) Write down the coordinates of A and B . (2 marks)

- (b) Find the equation of L_2 . (3 marks)

SECTION B (33 marks)

Answer any **THREE** questions in this section and write your answers in the spaces provided. Each question carries 11 marks.

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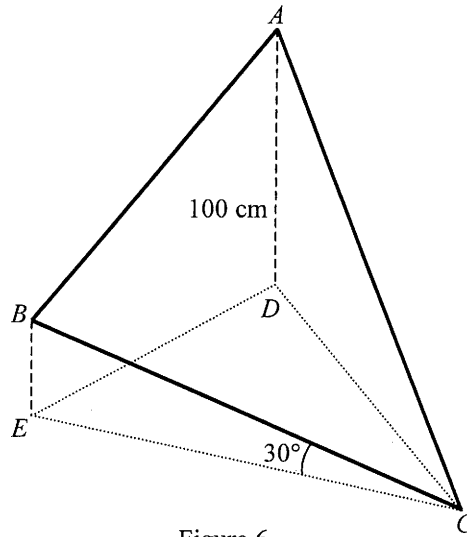


Figure 6

In Figure 6, a thin triangular board ABC is held with the vertex C on the horizontal ground. D and E are points on the ground vertically below A and B respectively. BC is inclined at an angle of 30° with the horizontal. It is known that $AD = 100$ cm, $BC = 120$ cm, $\angle CAB = 60^\circ$ and $\angle ABC = 80^\circ$.

- (a) Find BE and CE . (2 marks)
- (b) Find AB and AC . (3 marks)
- (c) Find $\angle CDE$ and the shortest distance from C to DE . (6 marks)

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17.

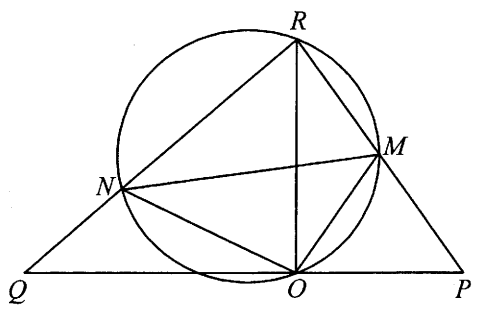


Figure 7(a)

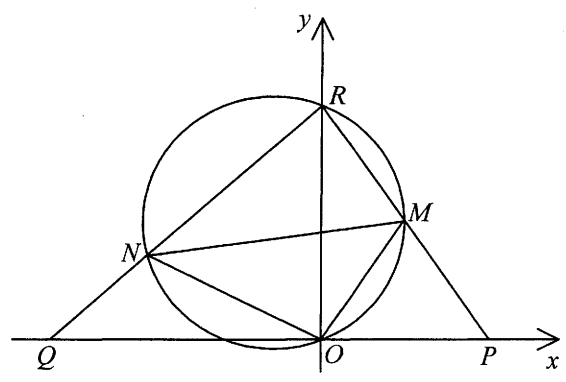


Figure 7(b)

- (a) In Figure 7(a), MN is a diameter of the circle $MONR$. The chord RO is perpendicular to the straight line POQ . RNQ and RMP are straight lines.
- (i) By considering triangles OQR and ORP , prove that $OR^2 = OP \cdot OQ$.
 - (ii) Prove that $\triangle MON \sim \triangle POR$. (5 marks)
- (b) A rectangular coordinate system, with O as the origin, is introduced to Figure 7(a) so that R lies on the positive y -axis and the coordinates of P and Q are $(4, 0)$ and $(-9, 0)$ respectively (see Figure 7(b)).
- (i) Find the coordinates of R .
 - (ii) If the centre of the circle $MONR$ lies in the second quadrant and $ON = \frac{3\sqrt{13}}{2}$, find the radius and the coordinates of the centre of the circle $MONR$. (6 marks)

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END OF PAPER