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

Make a the subject of the formula $P = ab + 2bc + 3ac$.		(3 marl
Simplify $\frac{(x^3y)^2}{y^5}$ and express your answer with positive indices.		(3 mai
Simplify $\frac{y^5}{y^5}$ and express your answer with positive indices.		(5 mai
	*	
" the mail found in party or self in a section of the first of a region of		
Factorize		
(a) $4x^2 - 4xy + y^2$,		
(b) $4x^2 - 4xy + y^2 - 2x + y$.		
		(3 mai

4. Solve the inequality $\frac{-3x+1}{4} > x-5$.

Also write down all integers which satisfy both the inequalities	$\frac{-3x+1}{4} > x-5$	and	$2x+1\geq 0$	
Also write down all integers which satisfy both the inequalities	4			

(3 marks)

5.	The ratio of the number of marbles owned by Susan to the number of marbles owned by Teres Susan has n marbles. If Susan gives 18 of her own marbles to Teresa, both of them will have number of marbles. Find n .	sa is 5:2 we the sam (3 marks



	Find the marked price of the calculator.		
(b)	If the calculator is sold at a 10 % discount on the mark percentage loss.	ed price, find the perce	
			(4 mar
		=	
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The first	1st term and the 2nd term of an arithmetic sequence are 5 n terms of the sequence is 3 925, find n .	and 8 respectively. If	f the sum of (4 mar
The first	1st term and the 2nd term of an arithmetic sequence are 5 n terms of the sequence is 3925 , find n .	and 8 respectively. If	f the sum of (4 mar
The first	1st term and the 2nd term of an arithmetic sequence are 5 n terms of the sequence is 3925 , find n .	and 8 respectively. If	f the sum of (4 mar
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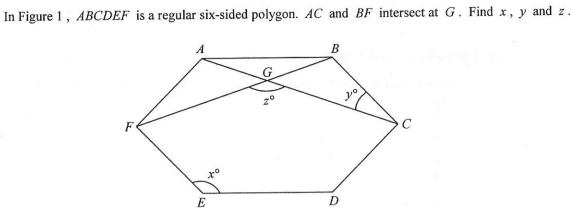


Figure 1

15	m	ar	ks

18		(3 marks)
(4)		
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8.

9. In Figure 2, OABC is a sector with $\widehat{ABC} = 10\pi$ cm.

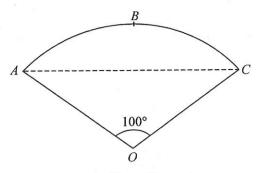


Figure 2

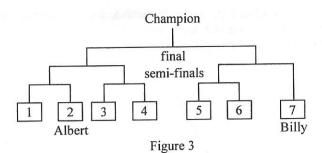
(a) Find OA.

(b)	Find the area of segment ABC.	(5 marks)

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Section A(2) (33 marks)
Answer ALL questions in this section and write your answers in the spaces provided.

(a)	Find $f(x)$.			(4 mark
		- 314		
			 7	
			 3	
(b)	Let $g(x) = f(x) - 6$.			
	(i) Prove that $x-3$ is a factor of g(x) .		
	(ii) Factorize $g(x)$.			(4 marl
				(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,



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.

Write down the probability that Albert will reach the semi-finals.	(1 mark)
Find the probability that Albert will be the champion.	(2 marks)
Find the probability that Albert will fail to reach the final.	(3 marks)
Find the probability that Albert will play against Billy in the final.	(2 marks)

12. Figure 4 shows a solid consisting of a right circular cone and a hemisphere with a common base. The height and the base radius of the cone are h cm and (h-4) cm respectively. It is known that the volume of the cone is equal to the volume of the hemisphere.

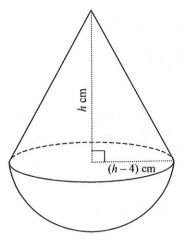


Figure 4

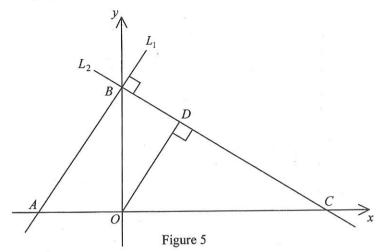
Find h.			(3 marks
	5.		

(a)

	area of the solid correct to t			
		2		

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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)

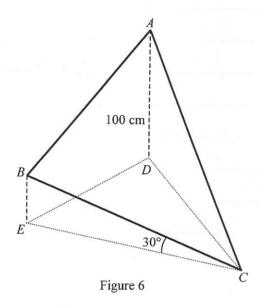
(b) Find the equation of L₂. (3 marks)

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	196	

SECTION B (33 marks)

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

14.



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 $AD = 100 \,\mathrm{cm}$, $BC = 120 \,\mathrm{cm}$, $\angle CAB = 60^{\circ}$ 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)

	0.00		

15.	The scores (in marks) obtained by a class of 20 students in a music test are shown below:					
	84	86	90	93	100	
	103	120	120	120	121	
	122	134	134	136	137	
	144	146	146	146	158	

- (a) Find the mean, the mean deviation and the standard deviation of the above scores. (4 marks)
- (b) Mary is one of the students in the class and her standard score in the music test is 1. Is Mary one of the top 20% students of the class in the music test? Explain your answer. (3 marks)
- (c) (i) If one student in the class withdraws, find the probability that the mean of the scores obtained by the remaining 19 students in the music test is 122 marks.
 - (ii) If two students in the class withdraw, find the probability that the mean of the scores obtained by the remaining 18 students in the music test is 122 marks.

			(4 marks)
			25
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16.	montl then a	hly. Fo a month	ws a loan of \$200 000 from a bank at an interest rate of 6% per annum, compounded are each successive month after the day when the loan is taken, loan interest is calculated and ally instalment of x is immediately paid to the bank until the loan is fully repaid (the last ay be less than x), where x < 200 000.
	(a)	(i)	Find the loan interest for the 1st month.
		(ii)	Express, in terms of x , the amount that Peter still owes the bank after paying the 1st instalment.
		(iii)	Prove that if Peter has not yet fully repaid the loan after paying the <i>n</i> th instalment, he still owes the bank $\{200\ 000(1.005)^n - 200x[(1.005)^n - 1]\}$.
			(6 marks)
	(b)	Suppo \$180	ose that Peter's monthly instalment is $$1800$ (the last instalment may be less than 0).
		(i)	Find the number of months for Peter to fully repay the loan.
		(ii)	Peter wants to fully repay the loan with a smaller monthly instalment. He requests to pay a monthly instalment of \$900. However, the bank refuses his request. Why? (5 marks)
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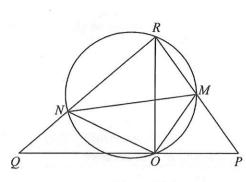


Figure 7(a)

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)

