HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY
HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION

MATHEMATICS Compulsory Part PAPER 1 (Sample Paper) Question-Answer Book

Time allowed: 2 hours 15 minutes
This paper must be answered in English.

INSTRUCTIONS

- 1. Write your Candidate Number in the space provided on Page 1.
- 2. Stick barcode labels in the spaces provided on Pages 1, 3, 5, 7 and 9.
- 3. This paper consists of THREE sections, A(1), A(2) and B. Each section carries 35 marks.
- 4. Attempt ALL questions in this paper. Write your answers in the spaces provided in this Question-Answer Book. Do not write in the margins. Answers written in the margins will not be marked.
- 5. Graph paper and supplementary answer sheets will be supplied on request. Write your Candidate Number, mark the question number box and stick a barcode label on each sheet, and fasten them with string INSIDE this book.
- 6. Unless otherwise specified, all working must be clearly shown.
- 7. Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
- 8. The diagrams in this paper are not necessarily drawn to scale.

Candidate Number				

	Marker's Use Only	Examiner's Use Only
	Marker No.	Examiner No.
Question No.	Marks	Marks
1-2		
3-4		
5-6		
7-8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
Total		

Please stick the barcode label here.

3.	Facto	prize
	(a)	$3m^2 - mn - 2n^2 ,$
	(b)	$3m^2 - mn - 2n^2 - m + n$. (3 marks)
0		
4.		marked price of a handbag is $$560$. It is given that the marked price of the handbag is 40% or than the cost.
	(a)	Find the cost of the handbag.
	(b)	If the handbag is sold at $$460$, find the percentage profit. (4 marks)
1		

(a) Find r.(b) Express the volume of the s	olid in terms of π . (4 mark
\wedge	
Figure 1	

7. In Figure 2, O is the centre of the semicircle ABCD. If AB # OC and $\angle BAD = 38^{\circ}$, find $\angle BDC$. (4 marks)

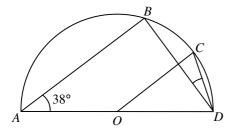


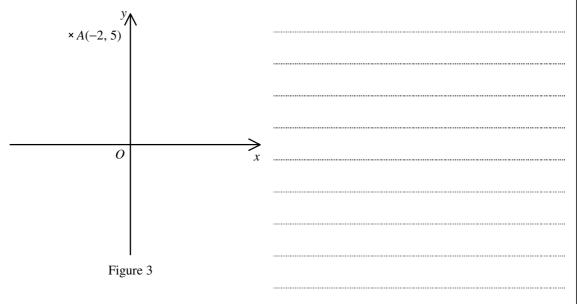
Figure 2



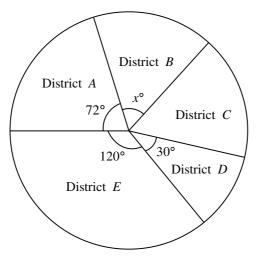
- 8. In Figure 3, the coordinates of the point A are (-2,5). A is rotated clockwise about the origin O through 90° to A'. A'' is the reflection image of A with respect to the y-axis.
 - (a) Write down the coordinates of A' and A''.
 - (b) Is OA'' perpendicular to AA'? Explain your answer.

(5 marks)

Answers written in the margins will not be marked.



9. In Figure 4, the pie chart shows the distribution of the numbers of traffic accidents occurred in a city in a year. In that year, the number of traffic accidents occurred in District A is 20% greater than that in District B.



The distribution of the numbers of traffic accidents occurred in the city

Figure 4

- (a) Find x.
- (b) Is the number of traffic accidents occurred in District A greater than that in District C? Explain your answer.

Answers written in the margins will not be marked.

(5 marks)

Please stick the barcode label here.

Section	on A(2)	(33 marks)
10.	(a) (b)	Find the quotient when $5x^3 + 12x^2 - 9x - 7$ is divided by $x^2 + 2x - 3$. (2 marks) Let $g(x) = (5x^3 + 12x^2 - 9x - 7) - (ax + b)$, where a and b are constants. It is given that $g(x)$ is divisible by $x^2 + 2x - 3$.
		(i) Write down the values of a and b .
		(ii) Solve the equation $g(x) = 0$. (4 marks)

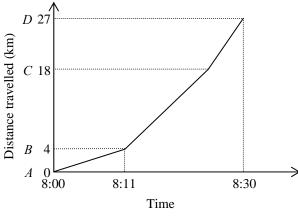


Figure 5

- (a) For which part of the journey is the average speed the lowest? Explain your answer. (2 marks)
- (b) If the average speed for Part II of the journey is 56 km/h, when is John at C? (2 marks)
- (c) Find the average speed for John driving from A to D in m/s. (3 marks)

13. In Figure 6, the straight line L_1 : 4x-3y+12=0 and the straight line L_2 are perpendicular to each other and intersect at A. It is given that L_1 cuts the y-axis at B and L_2 passes through the point (4,9).

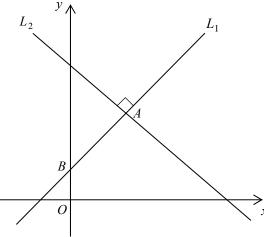


Figure 6

(a) Find the equation of L_2 .

(3 marks)

- (b) Q is a moving point in the coordinate plane such that AQ = BQ. Denote the locus of Q by Γ .
 - (i) Describe the geometric relationship between $\ \varGamma$ and $\ L_2$. Explain your answer.
 - (ii) Find the equation of Γ .

(6 marks)

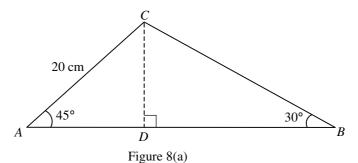
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the pr	as shown in I	re are numbere Figure 7. The If the theatre ca the theatre?	first rov	w has 12 sea	its. Each suc	ceeding row	has 3 more	seats than
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		28				44		
	3rd ro	ow 14 2nd row 13	2		$\frac{26}{11}$	27		
	•	1st row		F: 7	12	•		
				Figure 7				(4 marks)
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$B \qquad N = \log_8 E$ It is given that M and N are the magnitudes of an explosion on Scale A and Scale B rewhile E is the relative energy released by the explosion. If the magnitude of an explosion	
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while E is the relative energy released by the explosion. If the magnitude of an explosion	
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18. In Figure 8(a), ABC is a triangular paper card. D is a point lying on AB such that CD is perpendicular to AB. It is given that AC = 20 cm , $\angle CAD = 45^{\circ}$ and $\angle CBD = 30^{\circ}$.

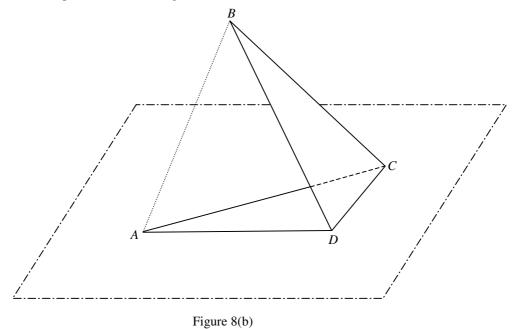


(a) Find, in surd form, BC and BD.

(3 marks)

Answers written in the margins will not be marked.

(b) The triangular paper card in Figure 8(a) is folded along CD such that ΔACD lies on the horizontal plane as shown in Figure 8(b).



- (i) If the distance between A and B is $18 \, \mathrm{cm}$, find the angle between the plane BCD and the horizontal plane.
- (ii) Describe how the volume of the tetrahedron ABCD varies when $\angle ADB$ increases from 40° to 140° . Explain your answer.

(5 marks)



19. In Figure 9, the circle passes through four points A, B, C and D. PQ is the tangent to the circle at C and is parallel to BD. AC and BD intersect at E. It is given that AB = AD.

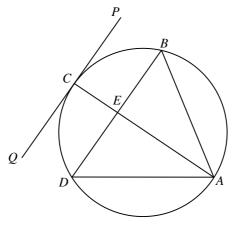


Figure 9

- (a) (i) Prove that $\triangle ABE \cong \triangle ADE$.
 - (ii) Are the in-centre, the orthocentre, the centroid and the circumcentre of ΔABD collinear? Explain your answer.

(6 marks)

Answers written in the margins will not be marked.

(b) A rectangular coordinate system is introduced in Figure 9 so that the coordinates of A, B and D are (14, 4), (8, 12) and (4, 4) respectively. Find the equation of the tangent PQ. (7 marks)

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