HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY HONG KONG CERTIFICATE OF EDUCATION EXAMINATION 2004

Seat Number

Centre Number

Candidate Number

MATHEMATICS PAPER 1

Question-Answer Book

8.30 am - 10.30 am (2 hours)
This paper must be answered in English

Section A Question No.

Marks

Marks

Marker No.

Examiner No.

Marker's Use Only

Examiner's Use Only

- 1. Write your Candidate Number, Centre Number and Seat Number in the spaces provided on this cover.
- 2. This paper consists of THREE sections, A(1), A(2) and B. Each section carries 33 marks.
- 3. 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.
- 4. Write the question numbers of the questions you have attempted in Section B in the spaces provided on this cover.
- 5. Unless otherwise specified, all working must be clearly shown.
- 6. Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
- 7. The diagrams in this paper are not necessarily drawn to scale.

	Y				drawn	should s.	ust be	on this	u have	umber de this	estion- will be	1 A(2), ce your) (x(x)	er.	er and			
	Checker's Use Only	*To be filled i	Section B Total			Section B Question No.*	Checker's Use Only		Section A Total	သိ	12	<u> </u>	10	9	7–8	5 - 6	3–4	
	Section B Total	*To be filled in by the candidate.				Marks	Section A Total											
j	Total	date.				Marks												

©香港考試及評核局 保留版權 Hong Kong Examinations and Assessment Authority All Rights Reserved 2004

Checker No

FORMULAS FOR REFERENCE

$\frac{1}{3}$ × base area × height	II	Volume	PYRAMID
base area × height	II	Volume	PRISM
$\frac{1}{3}\pi r^2 h$	11	Volume	
πrl	rface =	Area of curved surface	CONE
$\pi r^2 h$	11	Volume	
$2\pi rh$	rface =	Area of curved surface	CYLINDER
$\frac{4}{3}\pi r^3$	11	Volume	
4πr ²	II	Surface area	SPHERE

Please do not write in the margin

Page total

Simplify $\frac{(a^{-1}b)^3}{b^2}$

and express your answer with positive indices. (3 marks)

2. Make x the subject of the formula y =a-x2 (3 marks)

 $\dot{\omega}$ A sum of \$ 5000 is deposited at 2% p.a. for 3 years, compounded yearly. Find the interest correct to the nearest dollar.

4. B(0, b). Find a and b. In Figure 1, the graph of $y = -x^2 + 10x - 25$ touches the x-axis at A(a, 0) and cuts the y-axis at (3 marks)

Please do not write in the margin

A(a, 0) > x $y = -x^{2} + 10x - 25$ $B(0, b) = -x^{2} + 10x - 25$

Figure 1

6.

Factorize

(b)

 $169y^2 - 25$.

(a)

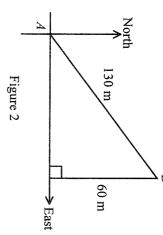
 $a^2 - ab + 2a - 2b ,$

Go on to the next page

5 In Figure 2, find the bearing of B from A.

(3 marks)

Page total



(4 marks)

			8. A box contains nine cards numbered 1, 2, 3, 4, 5, 6, 7, 8 and 9 respectively. (a) If one card is randomly drawn from the box, find the probability that the number drawn is odd.		
		eplacement, find the probability (5 marks)	ectively.		

-5-

9. In Figure 3, the area of the sector is $162\pi \text{ cm}^2$.

Page total

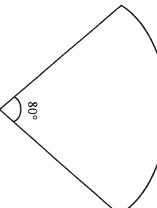


Figure 3

- (a) (b) Find the radius of the sector.
- Find the perimeter of the sector in terms of π .

(5 marks)

Answer ALL	Section A(2)
wer ALL questions in this section and	(33 marks)
his section an	
d write yo	

Please do not write in the margin

Ξ. A large group of students sat in a Mathematics test consisting of two papers, Paper I and Paper II . The table below shows the mean, median, standard deviation and range of the test marks of these students in each paper:

Paper II	Paper I	Test paper
60.3 marks	46.1 marks	Mean
60 marks	46 marks	Median
11.6 marks	15.2 marks	Standard deviation
70 marks	91 marks	Range

A student, John, scored 54 marks in Paper I and 66 marks in Paper II.

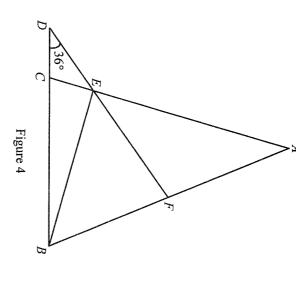
(a) Assume that the marks in each paper of the Mathematics test are normally distributed. Relative to other students, did John perform better in Paper II than in Paper I? Explain your answer.

(4 marks)

- 9 In a mark adjustment, the Mathematics teacher added 4 marks to the test mark of Paper I for each of these students. Write down the mean, the median and the range of the test marks of Paper I after the mark adjustment. (3 marks)

Go on to the next page

12. In Figure 4, AEC, AFB, BCD and DEF are straight lines. AB = AC, CD = CE and $\angle CDE = 36^{\circ}$



- (a) Find
- (i) $\angle AEF$,
- (ii) $\angle BAC$.

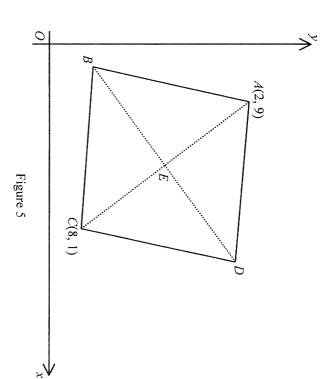
			1				,

-9-

Please do not write in the margin

Page total

13. In Figure 5, ABCD is a rhombus. The diagonals AC and BD cut at E.



(a)

the coordinates of E ,
the equation of BD . (4 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.

14. hollow sphere of radius 12 cm In Figure 6, a solid right circular cylinder of height h cm and volume $V \text{cm}^3$ is inscribed in a thin

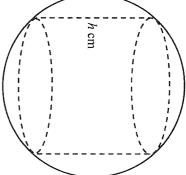


Figure 6



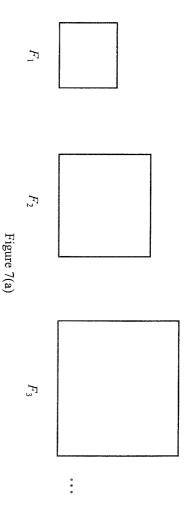
(3 marks)

- **(b)** Suppose $V = 600 \,\pi$
- Ξ Prove that there is a value of h lying between 4 and 5
- (ii) Using the method of bisection, find h correct to 1 decimal place, where 4 < h < 5(4 marks)

Please do not write in the margin

<u>O</u> If the volume of the cylinder is 286π cm³, find the exact height(s) of the cylinder. (4 marks)

15. In Figure 7(a), F_1 , F_2 , F_3 , ... are square frames. The perimeter of F_1 is 8 cm. Starting from F_2 , the perimeter of each square frame is 4 cm longer than the perimeter of the previous frame.



- (a) (i) Find the perimeter of F_{10} .
- (ii) be formed. form the above square frames, find the greatest number of distinct square frames that can If a thin metal wire of length 1,000 cm is cut into pieces and these pieces are then bent to

(5 marks)

(

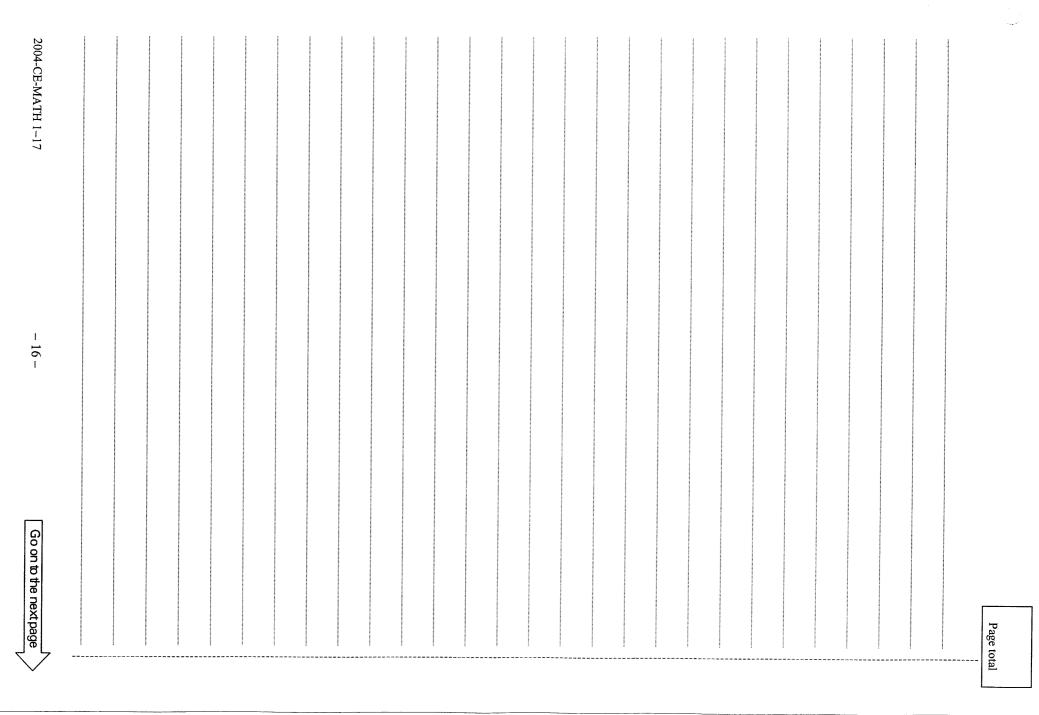
 S_1 S_2 Figure 7(b) S_3

Please do not write in the margin

Figure 7(b) shows three similar solid right pyramids S_1 , S_2 and S_3 . The total lengths of the four sides of the square bases of S_1 , S_2 and S_3 are equal to the perimeters of F_1 , F_2 and F_3 respectively.

- Ξ Do the volumes of S_1 , S_2 and S_3 form a geometric sequence? Explain your answer.
- Ξ answer in surd form. When the length of the slant edge of S_1 S 5 cm, find the volume of S_3 . Give the (6 marks)

15



- 16. In Figure 8, BC is a tangent to the circle OAB with BC//OA. OA is produced to D such that AD = OB. BD cuts the circle at E.
- (a) Prove that $\triangle ADE \cong \triangle BOE$.
- (3 marks)
- **(b)** Prove that $\angle BEO = 2\angle BOE$
- (3 marks)
- <u>o</u> Suppose OE is a diameter of the circle OAEB.
- (Ξ) Find ZBOE .
- (ii)A rectangular coordinate system is introduced in Figure 8 so that the coordinates of O and B are (0,0) and (6,0) respectively. Find the equation of the circle OAEB.

(5 marks)

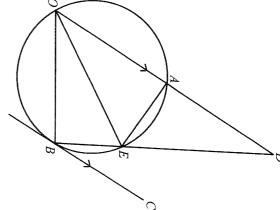
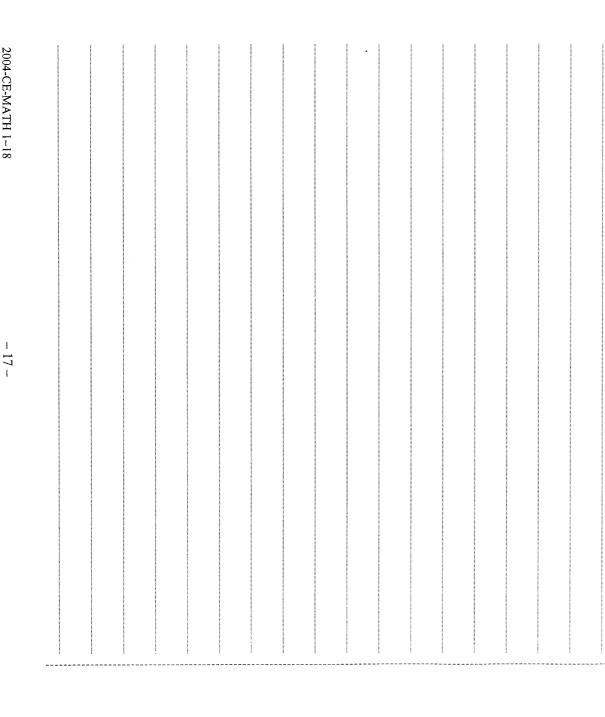
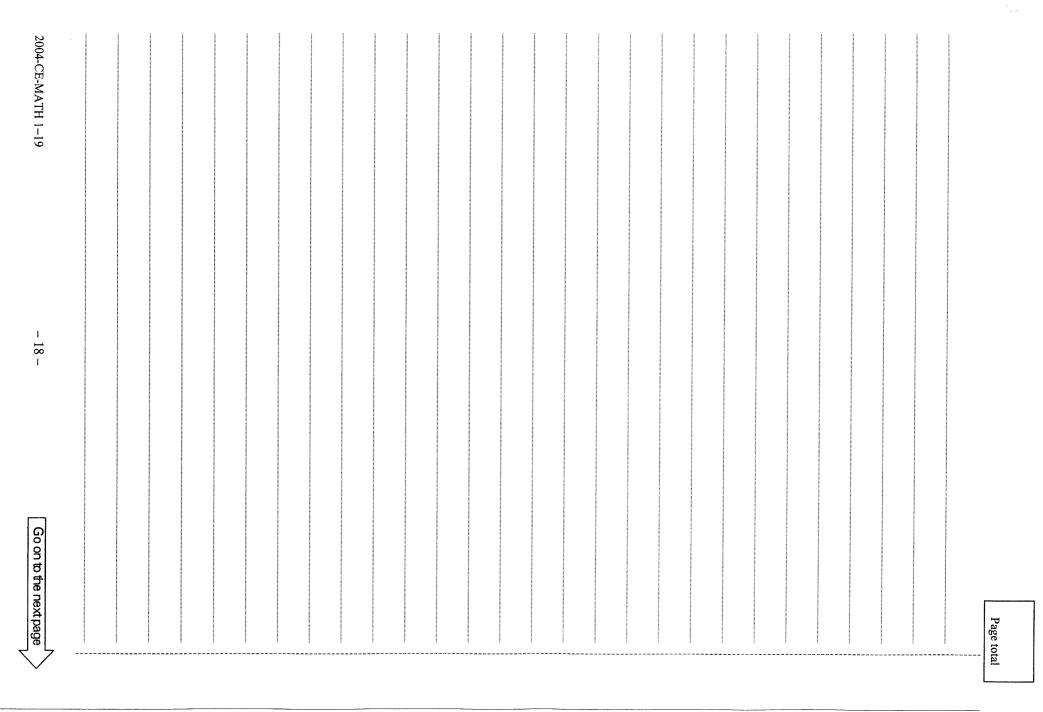


Figure 8





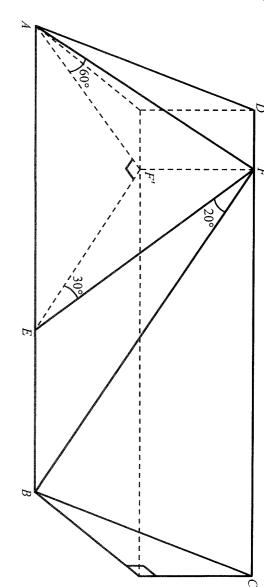


Figure 9

In Figure 9, ABCD is a rectangular inclined plane. E and F are points on the straight lines AB and CD respectively. F' is vertically below F. A, E, B and F' are on the same horizontal ground. $\angle AF'E = 90^{\circ}$, $\angle FAF' = 60^{\circ}$, $\angle FEF' = 30^{\circ}$, $\angle EFB = 20^{\circ}$ and EF = 20 m.

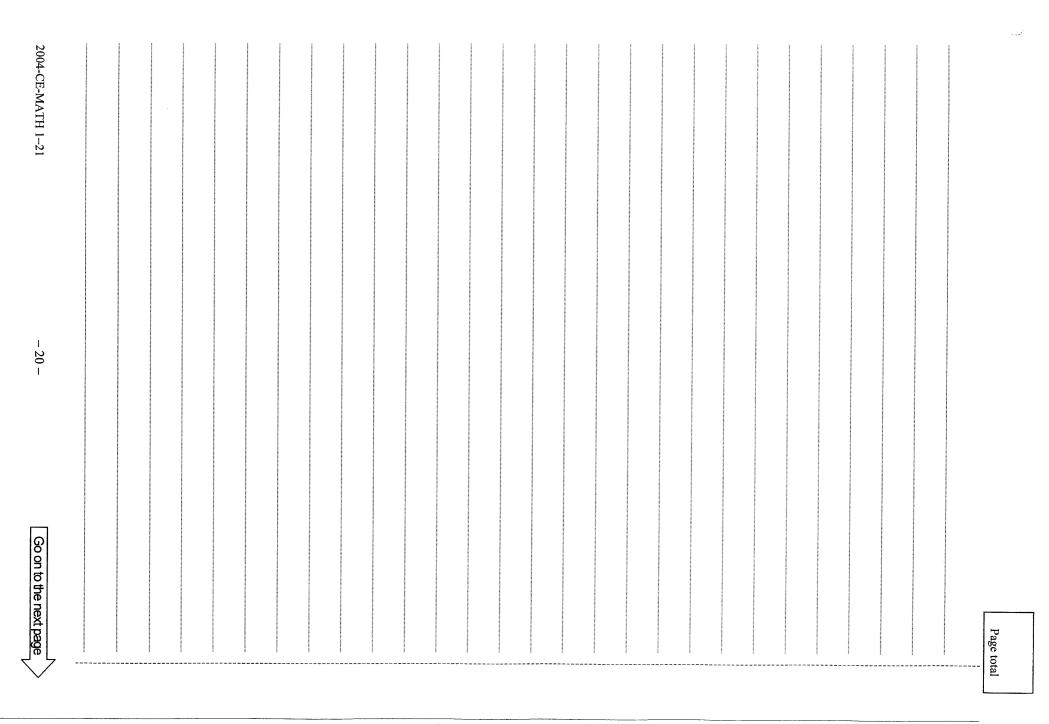
- (a) Find
- (i) FF' and AE,
- (ii) ∠AEF

(7 marks)

Please do not write in the margin

(going at the same time. A small red toy car goes straight from E to B at an average speed of 2 m/s while a small yellow toy car goes straight from F to B at an average speed of 3 m/s. The two toy cars start answer. Will the yellow toy car reach \mathcal{B} before the red one? Explain your (4 marks)

. 19 –



END OF PAPER
