2020-DSE MATH CP

PAPER 1

HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY
HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION 2020

MATHEMATICS Compulsory Part PAPER 1

Question-Answer Book

8:30 am - 10:45 am (2% hours)This paper must be answered in English

INSTRUCTIONS

- (1) After the announcement of the start of the examination, you should first write your Candidate Number in the space provided on Page 1 and stick barcode labels in the spaces provided on Pages 1, 3, 5, 7, 9 and 11.
- (2) This paper consists of THREE sections, A(1), A(2) and B.
- (3) 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.
- (4) 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.
- (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.
- (8) No extra time will be given to candidates for sticking on the barcode labels or filling in the question number boxes after the 'Time is up' announcement.

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	3.	(a)	Round up 534.7698 to the nearest hundred.	
		(b)	Round down 534.7698 to 2 decimal places.	
		(c)	Round off 534.7698 to 2 significant figures.	
				(3 marks)
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Answers written in the margins will not be marked.	4.	Let a	a, b and c be non-zero numbers such that $\frac{a}{b} = \frac{6}{7}$ and $3a = 4c$. Find $\frac{b+2c}{a+2b}$.	(3 marks)
nargi		200 0	b 7 $a+2b$	(5 marks)
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In a recruitment exercise, the number of male applicants is 28% more than the number of female applicants. The difference of the number of male applicants and the number of female applicants is 91.

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Let	$p(x) = 4x^2 + 12x + c$, where c is a constant. The equation $p(x) = 0$ has equal roots. If	ind
(a)	<i>C</i> ,	
(b)	the x-intercept(s) of the graph of $y = p(x) - 169$.	
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E Pigure 1	\geq_A
(a) Find $\angle BEC$	
(b) Let $\angle BDC = \theta$. Express $\angle CFE$ in terms of θ .	(5 marks)
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	Number of subjects taken	4	5	6	7	
	Number of students	8	12	16	4	
(a)	Write down the mean, the med	ian and the	standard devi	ation of the	above distribution.	
(b)	A new student now joins the c the change in the median of the	lass. The n	umber of sub	jects taken l	by the new student is student.	5 = (5 n
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	(2) (35 marks)
_	rice of a brand X souvenir of height $h \text{ cm}$ is P . P is partly constant and partly var. When $h=3$, $P=59$ and when $h=7$, $P=691$.
(a)	Find the price of a brand X souvenir of height 4 cm. (4 mark
(b)	Someone claims that the price of a brand X souvenir of height 5 cm is higher than the to price of two brand X souvenirs of height 4 cm. Is the claim correct? Explain your answer. (2 mark

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1.	The stem-and-leaf dia	gram be	elow sho	ws the	distribut	ion of tl	he weig	hts (in grai	ns) of the l	etters in a b	ag.
	Stem (tens)	Leaf (units)								
	1	1	2	3	3						
	2	3	3	4	5	6	9	9			
	3	1	6	7	8	8	8				
	4	2									

It is given that the range of the above distribution is the triple of its inter-quartile range.

(a) Find w.

(4 marks)

(b) If a letter is randomly chosen from the bag, find the probability that the weight of the chosen letter is not less than the mode of the distribution. (2 marks)

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14.	ates of the points A and B are $(-10,0)$ and $(30,0)$ respectively. The circle C passes and B . Denote the centre of C by G . It is given that the y -coordinate of G is -15 .		
	(a)	Find t	the equation of C . (3 marks)
	(b)	be a n to L	traight line L passes through B and G . Another straight line ℓ is parallel to L . Let P noving point in the rectangular coordinate plane such that the perpendicular distance from P is equal to the perpendicular distance from P to ℓ . Denote the locus of P by Γ . It is that Γ passes through A .
		(i)	Describe the geometric relationship between Γ and L .
		(ii)	Find the equation of Γ .
		(iii)	Suppose that Γ cuts C at another point H . Someone claims that $\angle GAH < 70^{\circ}$. Do you agree? Explain your answer. (6 marks)

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The	3rd term and the 6th term of a geometric sequence are 144 and 486 respectively.	
(a)	Find the 1st term of the sequence.	2 mark
(b)	Find the least value of n such that the sum of the first n terms of the sequence it than 8×10^{18} .	s greate 3 mark
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18. In Figure 2, U, V and W are points lying on a circle. Denote the circle by C. TU is the tangent to C at U such that TVW is a straight line.

Figure 2

(a) Prove that $\Delta UTV \sim \Delta WTU$.

Answers written in the margins will not be marked.

(2 marks)

- (b) It is given that VW is a diameter of C. Suppose that TU = 780 cm and TV = 325 cm.
 - (i) Express the circumference of C in terms of π .
 - (ii) Someone claims that the perimeter of ΔUVW exceeds 35 m . Do you agree? Explain your answer.

(5 marks)

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19. $PQRS$ is a quadrilateral paper card, where $PQ = 60 \text{ cm}$, $PS = 40 \text{ cm}$, $\angle PQR = 30^{\circ}$, $\angle PRQ = 55^{\circ}$ and $\angle QPS = 120^{\circ}$. The paper card is held with QR lying on the horizontal ground as shown in Figure 3.						
<i>Z</i> ,	/	Figure 3	(3 marks) (2 marks) most 20°. (7 marks)			
(a)		the length of RS.	(3 marks)			
(b)		the area of the paper card.	(2 marks)			
(c) It is given that the angle between the paper card and the horizontal ground is 32°.						
	(i)	Find the shortest distance from P to the horizontal ground.				
	(ii)	A student claims that the angle between RS and the horizontal ground is at a Is the claim correct? Explain your answer.	most 20°. (7 marks)			
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