SUN 日	MON 一	TUE 二	WED 三	THU 四	FRI 五	SAT 六

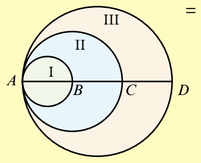
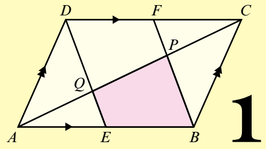
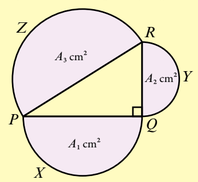
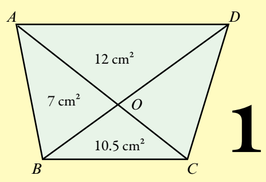
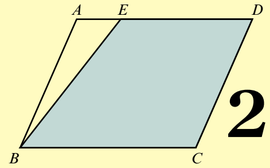
FEBRUARY
二月 2009

數學

2422U + 6578　　1331U + 5878

中文電碼

中文電碼，原本是於電報之中傳送中文信息的方法。它是第一個把漢字化作電子訊號的編碼表。中文電碼表採用了四位阿拉伯數字作代號，從0001到9999按四位數順序排列，最多可表達一萬個漢字、字母和符號。漢字先按部首，後按筆劃排列。字母和符號放到電碼表的最尾。如香港身份證，於每位持證人的中文姓名下面，均印有中文電碼。此外，在很多政府或商業機構的表格中，亦設有填寫中文電碼一欄，以便輸入電腦。

${}_9C_9 - {}_9C_8 + {}_9C_7 - {}_9C_6 + {}_9C_5 - {}_9C_4 + {}_9C_3 - {}_9C_2 + {}_9C_1 = ?$ **1** 初七	The smallest prime number x such that $17x + 3$ is also a prime number. **2** 初八	A straight line $y = m$ ($m > 0$) intersects the curve $y = x^2 - 3x - 4$ at $A(\alpha, k)$ and $B(\beta, m)$, find the value of $\alpha + \beta$. **3** 初九	$\frac{\pi}{x} = \frac{1}{1} - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots$, find x. **4** 立春	The unit digit of $1^{2009} \times 3^{2009} \times 5^{2009} \times 7^{2009} \times 9^{2009}$. **5** 十一	If $\frac{{}_nP_r}{{}_nC_r} = 720$, find r. **6** 十二	The remainder of $7^{2009} \div 100$. **7** 十三
$\sqrt{1 + 7\sqrt{1 + 8\sqrt{1 + 9\sqrt{\ldots}}}} = ?$ **8** 十四	In the figure, $ABCD$ is a straight line with $AB = BC = CD$. Three circles I, II and III are drawn respectively on AB, AC and AD as diameters. Area of circle I : Area of circle II : Area of circle III $= 1 : 4 : s$, $s = ?$  **9** 元宵	If $2x = 3y = 5z$, then $x : y : z = 15 : r : 6$, $r = ?$ **10** 十六	修改自九兒問甲《古算題》 一個公公九個兒，若問生年總不知， 自長排來差三歲，其年二百七歲期， 借問幼兒多少歲，各兒歲數要詳推。 **11** 十七	E and F are the mid-points of AB and DC respectively. BF and ED cut AC at P and Q respectively. If the area of $ABCD$ is 48, find the area of the shaded part.  **12** 十八	If the polar coordinates of the two points A and B are (5, 45°) and (12, 135°) respectively, find the distance between A and B. **13** 十九	A bag contains 2 black balls, 2 green balls and 2 yellow balls. John draws one ball at a time randomly without replacement until a green ball is drawn, the probability that he needs at most 4 draws is $\frac{k}{15}$, $k = ?$ **14** 二十
Find z if $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = \frac{9}{10}$ and $x < y < z$. **15** 廿一	If $x = \frac{1}{4}$ is one of the solution of $\log_4 x - \log_x 16 = 1$, find the other solution. **16** 廿二	In the figure, PXQ, QYR and RZP are semicircles and their areas are A_1 cm^2, A_2 cm^2 and A_3 cm^2 respectively. If $A_1 = 12$ and $A_2 = 5$, $A_3 = ?$  **17** 廿三	In the figure, AC cuts BD at O. The areas of $\triangle AOB$, $\triangle AOD$ and $\triangle BOC$ are 7 cm^2, 12 cm^2 and 10.5 cm^2 respectively. Find the area of $\triangle OCD$.  **18** 雨水	Dividing 404 oranges and 108 apples equally among a group of children left 5 oranges and 3 apples. There are 2 possible numbers of children satisfying this situation. Find the number of oranges each child gets when the larger number of children is taken. **19** 廿五	A man marks his goods at a price that will bring him a profit of 25% on the cost price. If he wants to sell his goods to a friend at the cost price, find the percentage discount on the marked price. **20** 廿六	In the figure, $ABCD$ is a parallelogram and $AE : ED = 1 : 3$. If the area of $\triangle ABE = 3$ cm^2. Find the area of the shaded region.  **21** 廿七
Number of zeros of "$1 \times 2 \times 3 \times \ldots \times 99$". **22** 廿八	輯錄自《九章算術》方程： 今有五羊、四犬、三雞、二兔，直錢一千四百九十六；四羊、二犬、六雞、三兔，直錢一千一百七十五；三羊、一犬、七雞、五兔，直錢九百五十八；二羊、三犬、五雞、一兔，直錢八百六十一。問雞價幾何？ **23** 廿九	The number of arrangements for 5 people sitting in a round circle. **24** 三十	$(\sqrt{2} + \sqrt{1})^{-1} + (\sqrt{3} + \sqrt{2})^{-1} + \ldots + (\sqrt{n} + \sqrt{n-1})^{-1} = 4$, find n. **25** 二月	The coefficient of n for $(2n + 1)^{13}$ **26** 初二	If a class of children is divided into groups of 5, 2 children will be left over. If the class is divided into groups of 6, 3 children will be left over. What is the smallest number of children the class could have? **27** 初三	Given $\log_{72-x} 1936 = 2$, find x . **28** 初四

Produced by:

Mathematics Education Section
Education Bureau

Contents from Maths Calendar 2009. Department of Applied Mathematics, The Hong Kong Polytechnic University

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