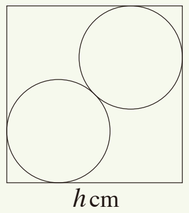
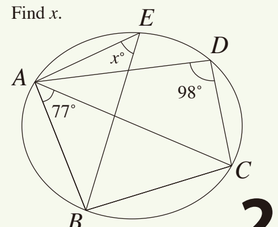
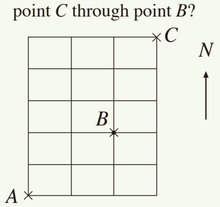
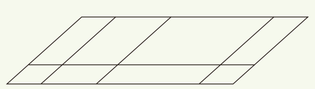
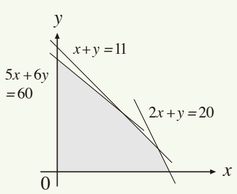
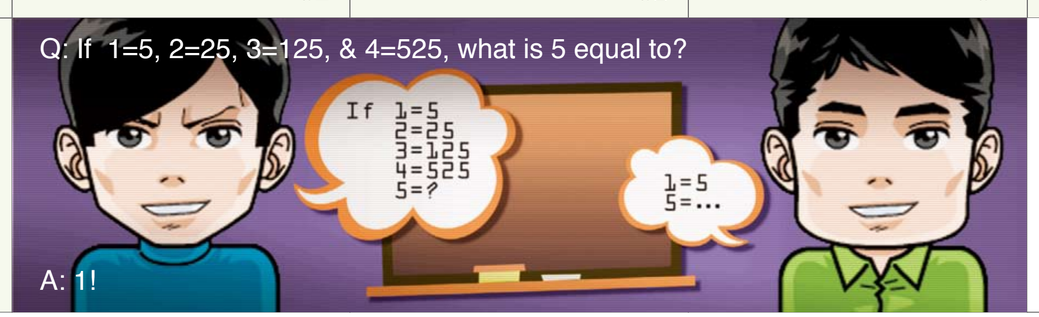
SUN 日	MON 一	TUE 二	WED 三	THU 四	FRI 五	SAT 六
Given that p is a positive number. If α and β are roots of $px^2 - x - 1 = 0$, find the value of $\frac{p}{\alpha+1} + \frac{p}{\beta+1} - 2p$. **1** 勞動節 廿九	如果圓柱體的高：底半徑 $= n:1$，在體積不變的情況下，求 n 的值使圓柱體的總表面面積為最小值。 **2** 勞動節翌日 三十	Find $\exp\left[\frac{1}{1}+\frac{1}{2}-\frac{2}{3}+\frac{1}{4}+\frac{1}{5}-\frac{2}{6}+\frac{1}{7}...\right]$. **3** 四月	P, Q and R represent the points $3 + i$, $-1 - i$ and $2i$ in Argand Diagram respectively. If $\angle PQR = \frac{\pi}{n}$, $n \in \mathbf{N}$, what is n? **4** 初二	If $2011_{(x)} = 256$, find x. **5** 初三	An integer consists of 2010 digits, each of which is 2. What is the reminder when this integer is divided by 9? **6** 立夏	Find a if a is a digit and the number $\overline{5a6a7a8a9a}$ is divisible by 11. **7** 初五
In an arithmetic sequence, the sum of the 2nd term, the 7th term and the 17th term is 70 while the sum of the 3rd term, the 9th term and the 17th term is 76. Find the 1st term. **8** 初六	Find the unit digit of $7^1 + 7^2 + 7^3 + \ldots + 7^{2011}$. **9** 初七	已知 $4^a = 5^b = 10$, 求 $\frac{5}{a} + \frac{10}{b}$ 的值。 **10** 佛誕 初八	Find the value of the expression $22[\cos\frac{\pi}{9} + \cos\frac{3\pi}{9} + \cos\frac{5\pi}{9} + \cos\frac{7\pi}{9}]$. **11** 初九	If $C_1^n + C_2^n + \ldots + C_n^n = 4095$, find n. **12** 初十	If m and n are integers, $m + n > 0$ and $21m + 4n = 1$, find the minimum value of $m + n$. **13** 十一	Find the coefficient of x^4 in the expansion of $\frac{1}{5}(1 + x + x^2 + x^3 + x^4)^5$. **14** 十二
An amount is deposited in a bank at yearly compound interest rate 5% p.a. At least after how many years, the total amount will be a double of the principal? **15** 十三	兩半徑為 $(16-8\sqrt{2})$ cm 的等圓與邊長為 h cm 的正方形兩兩相切。求 h。  **16** 十四	The sequence $a_1, a_2, a_3, \ldots$ satisfies $a_1 = 23$, $a_{20} = 20$ and if $n \geq 3$, a_n is the arithmetic mean of the first $(n-1)$ terms. Find a_2. **17** 十五	When $f(x) = x^{2001} - 11x + k$ is divided by $(x - 1)$, the remainder is 8. Find k. **18** 十六	$\overline{AAABC} \times C = \overline{CCCDA}$, where A, B, C, D are different digits. Find $10A + C$. **19** 十七	In how many ways can you give six different candies to two children if each child must get exactly three pieces? **20** 十八	Find x.  **21** 小滿
If x is a real number, find the maximum value of $x^2 - 6x + 31$. **22** 二十	Find $\frac{1}{2}+\frac{1}{3}+\frac{2}{3}+\frac{1}{4}+\frac{2}{4}+\frac{3}{4}+\ldots+\frac{7}{10}+\frac{8}{10}+\frac{9}{10}$ (correct to the nearest integer). **23** 廿一	If a person can walk towards north or east only, how many different paths are there for him to walk from point A to point C through point B?  **24** 廿二	In the sequence $\{a_n\}$, $a_1 = 10$, $a_2 = 30$, and $3a_{n+2} = 2a_{n+1} + a_n$ for all integers $n \geq 1$. Find $\lim_{n\to\infty} a_n$. **25** 廿三	Birthday of **Abraham de Moivre**. De Moivre was famous for de Moivre's Theorem, which connected complex numbers and trigonometry. He also had great contribution in probability theory. **26** 廿四	If $x - \frac{1}{x} = 5$, find $x^2 + \frac{1}{x^2}$. **27** 廿五	Three boxes marked 1, 2 and 3. How many ways are there putting 12 identical balls into these boxes such that each box contains at least the number of balls marked on the box? **28** 廿六
Given that $\cos^2 1^\circ + \cos^2 2^\circ + \cos^2 3^\circ + \ldots + \cos^2 89^\circ + \cos^2 90^\circ = x$. Find y if $3y = 2x - 2$. **29** 廿七	How many parallelograms are there in the following diagram?  **30** 廿八	(x, y) is a point in the shaded region (including the boundary) in the diagram. Find the maximum value of $3x + 2y$.  **31** 廿九		**MAY** 五月 2011

Produced by:

Mathematics Education Section
Education Bureau

Contents from Maths Calendar 2011. Department of Applied Mathematics, The Hong Kong Polytechnic University

The Hong Kong Polytechnic University 香港理工大學
Department of Applied Mathematics 應用數學系

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