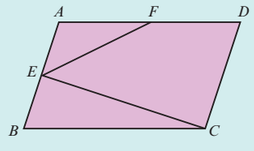
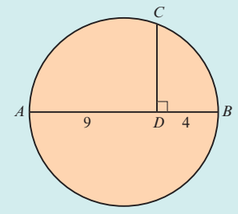
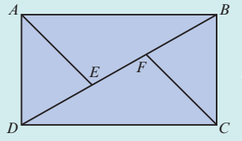
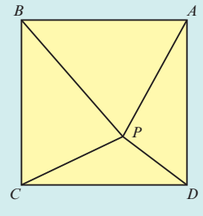
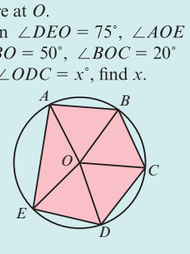
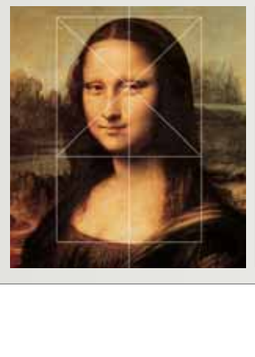
SUN 日	MON 一	TUE 二	WED 三	THU 四	FRI 五	SAT 六
	有一件工程，若甲單獨完成需6日，乙單獨完成需7日，丙單獨完成需14日。甲和乙一起工作2日後，丙再加入工作，問還需多少日方可以完成此工程。 **1** 十八	Simplify $\log\frac{2}{1}+\log\frac{3}{2}+\log\frac{4}{3}+\ldots+\log\frac{100}{99}$. **2** 十九	$ABCD$為一平行四邊形，其中$BC = 2AB$，$CE\perp AB$，F是AD的中點。 若$\angle DFE = n\angle AEF$，求n。  **3** 二十	Given $f(x) = a\sin x + b$ where a, b are constants and $a < 0$. If the minimum value of $f(x)$ is -6 and the maximum value of $f(x) = 2$, find the maximum value of $b\sin^2 x - a\cos^2 x$. **4** 立春	How many values are needed for plotting a box-and-whisker-plot for a given set of data? **5** 廿二	Given AB is the diameter and $CD\perp AB$, where $AD = 9$ and $BD = 4$. Find CD.  **6** 廿三
Find x for the system of equations $2^x - 5^y = 3$ and $2^{x-3} + 5^{y-2} = 21$. **7** 廿四	If α and β are roots of $x^2 + 2x + 2 = 0$, find $\alpha^5 + \beta^5$. **8** 廿五	20 balls are put into 2 bags with 10 balls in each bag. The balls in each bag are labeled numbers 1 to 10, all balls in one bag are white and all balls in the other bag are black. If one ball is drawn from each of two bags, the probability that the number labeled on the white ball is greater than that on the black ball is $\frac{k}{20}$, find k. **9** 廿六	A circle passes through the points (10, 0), (8, 2), (6, 8). Find its radius. **10** 廿七	$ABCD$ is a rectangle. $AB = 3p + 4$, $AD = 2p + 6$. AE and CF are perpendicular to the diagonal BD. If $p = 10$, find the length of EF (Correct to the nearest integer).  **11** 廿八	Find the largest area of a rectangle that can be inscribed in the ellipse $9x^2 + 4y^2 = 36$. **12** 廿九	若 $x = \sqrt{3+\sqrt{3}}$ 及 $y = \sqrt{3-\sqrt{3}}$， 求 $x^2(1+y^2)+y^2+1$。 除夕 **13** 三十
If the coefficient of x^6 in the Taylor's expansion of $(1+2x)e^{2x} + (1-2x)e^{-2x}$ is a, find $\frac{45a}{4}$. 農曆年初一 **14** 正月	Birthday of **Galileo Galilei**. Using his own pulse as a timer, Galileo discovered the pendulum isochronisms in 1581. He found that all bodies fall with the same acceleration and declared mechanical laws valid for all observers in uniform motion. He made the first telescopic observations. 農曆年初二 **15** 初二	Find k if the equations $x + 3y + 2 = 2x + 4y - k = x - 2y - 3k = 0$ are consistent. 農曆年初三 **16** 初三	Find the number of digits in $(2^{10})(3^{11})(5^{12})$ by using logarithms. **17** 初四	A point p moves in the $x-y$ plane such that the sum of its distances from the points $(-5, 0)$ and $(5, 0)$ is a constant d. If the locus of p passes through $(-9, 0)$, find d. **18** 初五	Find the smallest positive integer k such that $\sin^2\theta + 24\sin\theta\cos\theta + 11\cos^2\theta \le k$ for all real θ. **19** 雨水	在平面直角坐標系上，畫一個以原點為圓心，半徑長25的圓。 有多少個 x- 坐標和 y- 坐標皆為整數的點坐落在該圓上？ **20** 初七
設 a、b、c 滿足以下條件： $\begin{cases} a+b+c=3 \\ a^2+b^2+c^2=5 \\ a^3+b^3+c^3=10 \end{cases}$ 求 $a^4+b^4+c^4$。 **21** 初八	A and B are supplementary angles. Find $22\cos^2(A+B)$. **22** 初九	The median of 20 numbers is 26. If these numbers are arranged in descending order, the 10th number is 29. What is the largest possible value of the 12th number? **23** 初十	$ABCD$為一正方形。 若$PA = 15$，$PC = 20$及$PD = 7$，求PB。  **24** 十一	Points A, B, C, D, E are on a circle with centre at O. Given $\angle DEO = 75^\circ$, $\angle AOE = 100^\circ$, $\angle ABO = 50^\circ$, $\angle BOC = 20^\circ$ and $\angle ODC = x^\circ$, find x.  **25** 十二	The sum of 4 numbers is 120. If these 4 numbers are arranged in ascending order, the mean of the 2 middle numbers is 34. Find the mean of the remaining numbers. **26** 十三	The sum of 2 positive numbers a and b is 6. What is the largest possible value of $3ab$? **27** 十四
For $\triangle ABC$, $\angle B = 30^\circ$ and the length of side opposite $\angle B$ is 28 units. Find the radius of the circumcircle of the triangle. **28** 十五	**黃金矩形與藝術作品** 黃金矩形是一個長和寬比值為 $(1+\sqrt{5})/2$ 的矩形。有很多藝術作品都存在著與黃金矩形的關係，如達文西的三幅著名女性肖像〈蒙娜麗莎的微笑〉、〈抱貂女子〉及〈吉內薇拉．班琪〉的構圖方法均採用黃金矩形的定義而繪畫。每幅畫的表面都表上一個包含人物頭部及胸上方（至緊身胸衣處）的黃金矩形；接下來在黃金矩形上半部切割出一個正方形，其大小則按正方形高度而定，再按正方形對角線的交接點繪畫眼睛。					**FEBRUARY** **二月 2010**

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