

SUN 日	MON 一	TUE 二	WED 三	THU 四	FRI 五	SAT 六
 $\frac{\Delta + \psi}{\Delta} = \frac{\Delta}{\psi} = \phi (= 1.618\dots)$	<p>If $\log_p x = 2$, $\log_q x = 3$, $\log_r x = 6$ and $\log_{pqr} x = d$, find d.</p> <p style="text-align: right;">1 廿五</p>	<p>Find the tens digit of 5^{5^5}.</p> <p style="text-align: right;">2 廿六</p>	<p>Suppose $x^{\frac{1}{2}} + x^{-\frac{1}{2}} = 3$ and $\frac{1}{m} = \frac{x^{\frac{3}{2}} + x^{-\frac{3}{2}} - 3}{x^2 + x^{-2} - 2}$. Find m without using a calculator.</p> <p style="text-align: right;">3 廿七</p>	<p>If the angles of a P-sided polygon form an arithmetic progression and the smallest and the largest angles are 20° and 160° respectively, find P.</p> <p style="text-align: right;">4 廿八</p>	<p>Find the thousands digit of $2002^2 - 2001^2 + 2000^2 - 1999^2 + \dots + 4^2 - 3^2 + 2^2 - 1^2$.</p> <p style="text-align: right;">5 廿九</p>	<p>Given that a quadratic equation $a(x+1)(x+2) + b(x+2)(x+3) + c(x+3)(x+1) = 0$ has roots 0 and 1. Find $\frac{a}{b}$.</p> <p style="text-align: right;">6 十月</p>
<p>Let f be a function such that $f(1) = 1$ and for any integers m and n, $f(m+n) = f(m) + f(n) + mn$. Find the digit in the middle of the value of $f(2003)$.</p> <p style="text-align: right;">7 立冬</p>	<p>If $\frac{5}{7} + \frac{x}{7} = \left(\frac{5}{7}\right)^3 + \left(\frac{x}{7}\right)^3$, find x. (x is a positive integer)</p> <p style="text-align: right;">8 初三</p>	<p>Assume that a test to detect a disease whose prevalence is 1000^{-1} has a false positive rate of $k\%$ and a true positive rate of 100%. If the probability that a person is found to have a positive result actually has the disease is about 0.011. Find k (correct to the nearest integer).</p> <p style="text-align: right;">9 初四</p>	<p>One of the roots of $x^2 + kx + 16 = 0$, where $k > 0$, is four times the other root, find k.</p> <p style="text-align: right;">10 初五</p>	<p>Let x and y be two positive numbers that are inversely proportional to each other. If x is increased by 10%, y will be decreased by $\frac{100}{m}\%$. Find m.</p> <p style="text-align: right;">11 初六</p>	<p>What positive integer has a Scrabble score equal to that integer?</p> <p style="text-align: right;">12 初七</p>	<p>Given $f(x) = x^3 - 11x^2 - 25x - 13$ has a double root. Find the other root.</p> <p style="text-align: right;">13 初八</p>
<p>三堆不等數的火柴，共 48 根，從第一堆中拿走和第二堆火柴數目一樣多的火柴放在第二堆中；然後再從第二堆中拿走和第三堆火柴數目一樣多的火柴放在第三堆中；最後再從第三堆中拿走和第一堆火柴數目一樣多的火柴放在第一堆。結果三堆火柴的數目一樣，問原來第二堆有多少火柴？</p> <p style="text-align: right;">14 初九</p>	<p>If $2x = 3y = 5z$, then $x : y : z = r : 10 : 6$. Find r.</p> <p style="text-align: right;">15 初十</p>	<p>Birthday of Jean le Rond D'Alembert. Born illegitimately to Louis Camus Destouches-Canon and Claudine de Tencin, he was editor of the Encyclopedia. He founded analytical mechanics on a principle of virtual work and solved the wave equation.</p> <p style="text-align: right;">16 十一</p>	<p>Find the smallest positive integer which has remainders 1, 2, 5, 5 when it is divided by 2, 3, 6, 12 respectively.</p> <p style="text-align: right;">17 十二</p>	<p>有一位聰明的謎語家，別人問他幾歲時，他總是十分巧妙的回答：「把我三年後的年齡乘 3 倍然後減去三年前年齡的 3 倍，你就可以知道我的年齡了。」你說，他幾多歲呢？</p> <p style="text-align: right;">18 十三</p>	<p>Let P and $P + 2$ be both prime numbers satisfying $P(P + 2) \leq 150$. Find the sum of all such possible values of P.</p> <p style="text-align: right;">19 十四</p>	<p>A special team is formed by the government to enhance economy. There are 2 senior and 5 junior officers. How many ways can the team be formed so that it comprises of 1 senior and 3 juniors?</p> <p style="text-align: right;">20 十五</p>
<p>Assume that the curve $x^2 + 3y^2 = 12$ and the straight line $mx + y = 16$ intersect at one point only. Find m^2.</p> <p style="text-align: right;">21 十六</p>	<p>某農場主有一塊均勻植草的三角形草地，他把草地分成東、南、西、北四塊(如圖)。經過統計得出，在西邊草地可收 5 隻羊，南邊草地可收 10 隻羊，東邊草地可收 8 隻羊，問在北邊草地可收幾多隻羊？</p>  <p style="text-align: right;">22 小雲</p>	<p>展覽館的入場票價是：每人 2 元，25 人或以上的團體票以 9 折優惠。問 25 人以下的個人票價從多少人開始不少於 25 人的團體票總票價？</p> <p style="text-align: right;">23 十八</p>	<p>When a 3-digit number minus the sum of the three digits, the difference is a 3-digit number $46\bar{x}$, find $3x$.</p> <p style="text-align: right;">24 十九</p>	<p>Let r and s be the two distinct real roots of the equation $2\left(x^2 + \frac{1}{x^2}\right) - 3\left(x + \frac{1}{x}\right) = 1$. Find $10(r + s)$.</p> <p style="text-align: right;">25 二十</p>	<p>If $f(x)$ is a real-valued function defined on the set of real numbers such that $f(x+y) = f(x) + f(y)$ for all real numbers x, y and $f(x) > 0$ when $x > 0$. If $f(-1) = -2$, find $f(13)$.</p> <p style="text-align: right;">26 廿一</p>	<p>一幢 35 層大樓有一部電梯在第一層，它最多能容納 34 人，而且只能在第 2 層至 35 層中的某一層停一次。對於每個人來說，他往下走一層樓梯會感到 1 分不滿意，往上走一層樓梯會感到 3 分不滿意。現在有 34 人在第一層，並且他們分別住在第 2 層至 35 層的某一層。問電梯應停在那一層才可使這 34 人不滿意的總分達到最小？</p> <p style="text-align: right;">27 廿二</p>
<p>Let $[x]$ denote the integral part of a real number x. Find the value of $\left[\frac{10}{3}\right] + \left[\frac{12}{3}\right] + \left[\frac{14}{3}\right] + \left[\frac{16}{3}\right] + \left[\frac{18}{3}\right] + \left[\frac{20}{3}\right]$.</p> <p style="text-align: right;">28 廿三</p>	<p>將自然數按圖中的規則排列，每個自然數都對應一個坐標，如 3 的對應坐標是 (1, 1)。求 3481 對應的 x 坐標。</p>  <p style="text-align: right;">29 廿四</p>	<p>If $\text{LCM}(a, b) = 210$ and $\text{HCF}(a, b) = 10$ and $a < b$, find the value of a.</p> <p style="text-align: right;">30 廿五</p>	<p>黃金矩形 — 埃及金字塔</p> <p>古埃及的建築師在設計金字塔時最先會考慮什麼？難道他們很早便知道建築上的結構比例與黃金比例的關係？有趣的是他們於計算金字塔正面和基底的面積時，底面積是 $\Psi = 52900\text{m}^2$，而四面加起來總面積 $\Delta = 85600\text{m}^2$；以公式計算，這兩個值之間的關係是 1.618，正與黃金比例值 1.62 相等。</p>  <p style="text-align: right;">Nov 十一月 2010</p>			

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