Hong Kong Mathematics Olympiad (1988 – 89)
Heat Event (Group)
香港数学竞赛 (1988 – 89)
初赛项目 (团体)

1. Given a and b are distinct real numbers satisfying $a^2=5a+10$ and $b^2=5b+10$. Find the value of $\frac{1}{a^2}+\frac{1}{b^2}$.

   a、b 为两相异实数，且 $a^2=5a+10$ 及 $b^2=5b+10$，求 $\frac{1}{a^2}+\frac{1}{b^2}$ 的值。

2. An interior angle of an n-sided convex polygon is $x°$ while the sum of other interior angles is $800°$. Find the value of n.
   一凸 n 边形的一个内角是 $x°$，其他内角的和是 $800°$，求 n 的值。

3. It is known that $1^2+2^2+\cdots+n^2=\frac{n(n+1)(2n+1)}{6}$ for all positive integers n.

   Find the value of $21^2+22^2+\cdots+30^2$.

   已知对所有正整数 n，$1^2+2^2+\cdots+n^2=\frac{n(n+1)(2n+1)}{6}$，求 $21^2+22^2+\cdots+30^2$ 的值。

4. One of the positive integral solutions of the equation $19x+88y=1988$ is given by (100, 1). Find another positive integral solution.
   方程 $19x+88y=1988$ 的其中一组正整数解是 (100, 1)，求另一组正整数解。

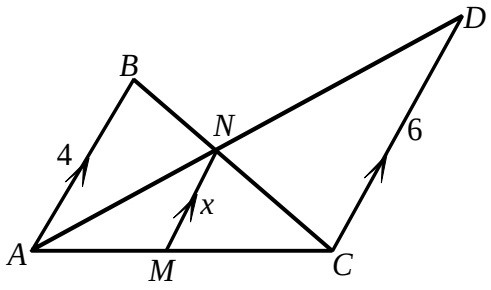
5. The line joining $A(2, 3)$ and $B(17, 23)$ meets the line $2x-y=7$ at P. Find the value of $\frac{AP}{PB}$.

   A(2, 3) 与 B(17, 23) 的联线交 $2x-y=7$ 于 P，求 $\frac{AP}{PB}$ 的值。

6. Find the remainder when 7^{2047} is divided by 100.
   求 7^{2047} 被 100 除所得的余数。

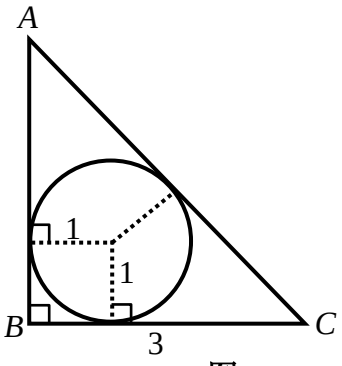
7. If $\log_2[\log_3(\log_7 x)]=\log_3[\log_7(\log_2 y)]=\log_7[\log_2(\log_3 z)]=0$, find the value of $x+y+z$.
   若 $\log_2[\log_3(\log_7 x)]=\log_3[\log_7(\log_2 y)]=\log_7[\log_2(\log_3 z)]=0$，求 $x+y+z$ 的值。

8. In figure 1, $AB // MN // CD$. If $AB = 4$, $CD = 6$ and $MN = x$, find the value of x.
在图 1 中，$AB // MN // CD$。若 $AB = 4$、$CD = 6$ 及 $MN = x$，求 x 的值。



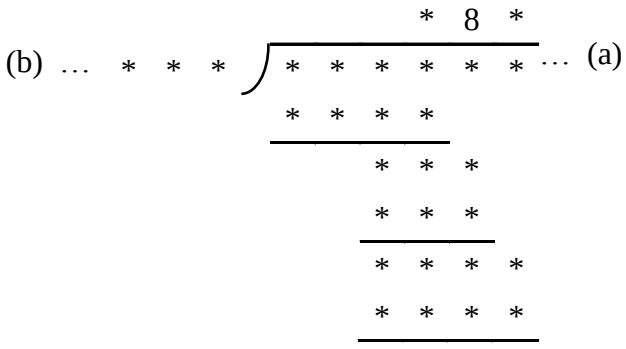
(Figure 1)(图 1)

9. In Figure 2, $\angle B = 90°$, $BC = 3$ and the radius of the inscribed circle of ΔABC is 1. Find the length of AC.
在图 2 中，$\angle B = 90°$、$BC = 3$，且 ΔABC 的内切圆半径长 1 单位，求 AC 的长。



(Figure 2)(图 2)

10. In the attached division (see Figure 3), the dividend in (a) is divisible by the divisor in line (b). Find the dividend in line (a). (Each asterisk * is an integer from 0 to 9.)
在所附除法算式中 (见图 3)，(a) 列的被除数可被 (b) 列的除数整除。求 (a) 列的被除数。 (每一星号 * 为由 0 至 9 的整数。)



(Figure 3)(图 3)