Hong Kong Mathematics Olympiad (1984 – 85)
Sample Event (Group)
香港数学竞赛 (1984 – 85)
决赛项目 – 样本 (团体)

(i) If $a*b = ab + 1$ and $s = (2*4)*2$, find s.

若 $a*b = ab + 1$，且 $s = (2*4)*2$，求 s。

$s =$

(ii) If the nth prime number is s, find n.

若第 n 个质数为 s，求 n。

$n =$

(iii) If $K = \left(1-\frac{1}{2}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right)\cdots\left(1-\frac{1}{50}\right)$, find K in the simplest fractional form.

若 $K = \left(1-\frac{1}{2}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right)\cdots\left(1-\frac{1}{50}\right)$，试以最简单之分数表 K。

$K =$

(iv) If A is the area of a square inscribed in a circle of radius 10, find A.

一正方形内接于一个半径为 10 之圆。若正方形之面积为 A，求 A。

$A =$

Hong Kong Mathematics Olympiad (1984 – 85)
Event 6 (Group)
香港数学竞赛 (1984 – 85)
决赛项目 6 (团体)

(i) The average of p, q, r is 4.
The average of p, q, r, x is 5. Find x.

$x =$

p, q, r 之平均数为 4。
p, q, r, x 之平均数为 5。求 x。

(ii) A wheel of a truck travelling at 60 km/h makes 4 revolutions per second. If its diameter is $\frac{y}{6\pi}$ m, find y.

$y =$

一行车速度为 60 km/h 的货车之一轮每秒转动 4 周，若其直径为 $\frac{y}{6\pi}$ m，求 y。

(iii) If $\sin(55 - y)^\circ = \frac{d}{x}$, find d.

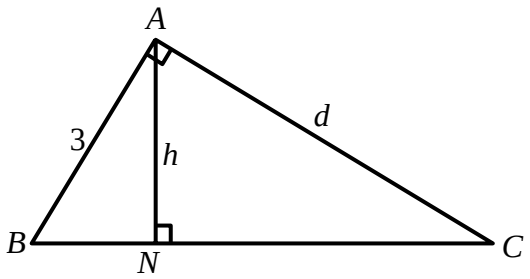
$d =$

若 $\sin(55 - y)^\circ = \frac{d}{x}$，求 d。

(iv) In the figure, $BA \perp AC$ and $AN \perp BC$. If $AB = 3$, $AC = d$, $AN = h$, find h.

$h =$

如附图所示，$BA \perp AC$ 及 $AN \perp BC$。若 $AB = 3$，$AC = d$，$AN = h$，求 h。



Hong Kong Mathematics Olympiad (1984 – 85)
Event 7 (Group)
香港数学竞赛 (1984 – 85)
决赛项目 7 (团体)

(i) Let $M = \dfrac{78^3 + 22^3}{78^2 - 78 \times 22 + 22^2}$. Find M .

$M =$

设 $M = \dfrac{78^3 + 22^3}{78^2 - 78 \times 22 + 22^2}$。求 M。

(ii) When the positive integer N is divided by $6, 5, 4, 3$ and 2, the remainders are $5, 4, 3, 2$ and 1 respectively. Find the least value of N .

$N =$

正整数 N 分别被 $6, 5, 4, 3$ 及 2 除时，其余数依次 为 $5, 4, 3, 2$ 及 1。求 N 之最小值。

(iii) A man travels 10 km at a speed of 4 km/h and another 10 km at a speed of 6 km/h . If the average speed of the whole journey is x km/h , find x .

$x =$

一人以 4 km/h 之速度步行 10 km，再以 6 km/h 之速度步行另 10 km。若全程之平均速度为 x km/h，求 x。

(iv) If $S = 1 + 2 - 3 - 4 + 5 + 6 - 7 - 8 + \cdots + 1985$, find S .

$S =$

若 $S = 1 + 2 - 3 - 4 + 5 + 6 - 7 - 8 + \cdots + 1985$，求 S。

Hong Kong Mathematics Olympiad (1984 – 85)
Event 8 (Group)
香港数学竞赛 (1984 – 85)
决赛项目 8 (团体)

M, N are positive integers less than 10 and
$258024M8 \times 9 = 2111110N \times 11$.

M, N 均为小于 10 之正整数，且
$258024M8 \times 9 = 2111110N \times 11$。

(i) Find M.
求 M。

$M =$

(ii) Find N.
求 N。

$N =$

(iii) A convex 20-sided polygon has x diagonals. Find x.

一凸 20 边形有 x 条对角线。求 x。

$x =$

(iv) If $y = ab + a + b + 1$ and $a = 99$, $b = 49$, find y.

若 $y = ab + a + b + 1$ 且 $a = 99$， $b = 49$，求 y。

$y =$

Hong Kong Mathematics Olympiad (1984 – 85)
Event 9 (Group)
香港数学竞赛 (1984 – 85)
决赛项目 9 (团体)

(i) The lengths of the 3 sides of ΔLMN are 8 , 15 and 17 respectively. If the area of ΔLMN is A , find A .

ΔLMN 之三边长分别为 8 , 15 及 17。若 ΔLMN 之面积为 A，求 A。

$A =$

(ii) If r is the length of the radius of the circle inscribed in ΔLMN , find r .

若 ΔLMN 之内接圆之半径为 r，求 r。

$r =$

(iii) If the rth day of May in a year is Friday and the nth day of May in the same year is Monday, where $15 < n < 25$, find n .

若某年五月第 r 日为星期五，且同年五月第 n 日为星期一，其中 $15 < n < 25$，求 n。

$n =$

(iv) If the sum of the interior angles of an n-sided convex polygon is $x°$, find x .

若一凸 n 边形之内角和为 $x°$，求 x。

$x =$

Hong Kong Mathematics Olympiad (1984 – 85)
Event 10 (Group)
香港数学竞赛 (1984 – 85)
决赛项目 10 (团体)

(i) The sum of 3 consecutive odd integers (the smallest being k) is 51. Find k.

三连续奇数 (最小者为 k) 之和为 51。求 k。

$k =$

(ii) If $x^2+6x+k \equiv (x+a)^2+C$, where a, C are constants, find C.

若 $x^2+6x+k \equiv (x+a)^2+C$，且 a，C 为常数，求 C。

$C =$

(iii) If $\frac{p}{q}=\frac{q}{r}=\frac{r}{s}=2$ and $R=\frac{p}{s}$, find R.

若 $\frac{p}{q}=\frac{q}{r}=\frac{r}{s}=2$ 且 $R=\frac{p}{s}$，求 R。

$R =$

(iv) If $A=\frac{3^n 9^{n+1}}{27^{n-1}}$, find A.

若 $A=\frac{3^n 9^{n+1}}{27^{n-1}}$，求 A。

$A =$