Hong Kong Mathematics Olympiad (1987 – 88)

Sample Event (Group)

香港数学竞赛 (1987 – 88)

决赛项目 – 样本 (团体)

(i) The acute angle between the 2 hands of a clock at 3:30 p.m. is $p°$. Find p.

在下午三时卅分，时钟两针之间的锐角是 $p°$，求 p。

$p =$

(ii) In ΔABC, $\angle B = \angle C = p°$. If $q = \sin A$, find q.

在 ΔABC 中，$\angle B = \angle C = p°$。若 $q = \sin A$，求 q。

$q =$

(iii) The 3 points $(1, 3)$, $(2, 5)$ and $(4, a)$ are collinear. Find a.

三点 $(1, 3)$、$(2, 5)$、$(4, a)$ 共线。求 a。

$a =$

(iv) The average of 7, 9, x, y and 17 is 10. If the average of $x + 3$, $x + 5$, $y + 2$, 8 and $y + 18$ is m, find m.

7，9，x，y，17 的平均数是 10。若 $x + 3$，$x + 5$，$y + 2$，8，$y + 18$ 的平均数是 m，求 m。

$m =$

Hong Kong Mathematics Olympiad (1987 – 88)

Event 6 (Group)

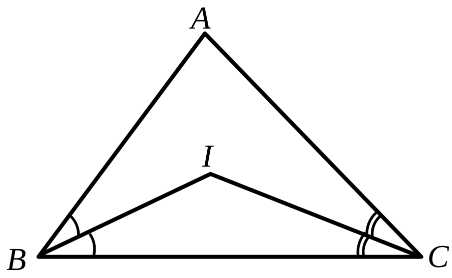
香港数学竞赛(1987 – 88)

决赛项目 6 (团体)

(i) In the figure, the bisectors of $\angle B$ and $\angle C$ meet at I. If $\angle A = 70°$ and $\angle BIC = x°$, find x.

$x =$

附图中 $\angle B$ 及 $\angle C$ 的平分线相交于 I。若 $\angle A = 70°$， $\angle BIC = x°$，求 x。



(ii) A convex n-sided polygon has 35 diagonals. Find n.

$n =$

一凸 n 边形有 35 条对角线。求 n。

(iii) If $y = ab - a + b - 1$ and $a = 49$, $b = 21$, find y.

$y =$

若 $y = ab - a + b - 1$，且 $a = 49$， $b = 21$，求 y。

(iv) If $K = 1 + 2 - 3 - 4 + 5 + 6 - 7 - 8 + \cdots + 1001 + 1002$, find K.

$K =$

若 $K = 1 + 2 - 3 - 4 + 5 + 6 - 7 - 8 + \cdots + 1001 + 1002$，求 K。

Hong Kong Mathematics Olympiad (1987 – 88)

Event 7 (Group)

香港数学竞赛**(1987 – 88)**

决赛项目 **7 (**团体**)**

M, N are positive integers less than 10 and

$$8M420852 \times 9 = N9889788 \times 11\ .$$

M、N 是小于 10 的正整数，且

$$8M420852 \times 9 = N9889788 \times 11\text{。}$$

(i) Find M. | $M =$

求 M。

(ii) Find N. | $N =$

求 N。

(iii) The equation of the line through $(4, 3)$ and $(12, -3)$ is $\frac{x}{a}+\frac{y}{b}=1$. Find a. | $a =$

经过 $(4, 3)$ 及 $(12, -3)$ 的直线方程是 $\frac{x}{a}+\frac{y}{b}=1$。求 a。

(iv) If $x + k$ is a factor of $3x^2+14x+a$, find k. (k is an integer.) | $k =$

若 $x + k$ 是 $3x^2+14x+a$ 的因式，求 k。(k 是整数)

Hong Kong Mathematics Olympiad (1987 – 88)

Event 8 (Group)

香港数学竞赛(1987 – 88)

决赛项目 8 (团体)

(i) If $\log_9 S = \frac{3}{2}$, find S.

若 $\log_9 S = \frac{3}{2}$，求 S。

$S =$

(ii) If the lines $x + 5y = 0$ and $Tx - Sy = 0$ are perpendicular to each other, find T.

若直线 $x + 5y = 0$ 及 $Tx - Sy = 0$ 互相垂直，求 T。

$T =$

The 3-digit number AAA, where $\mathrm{A} \neq 0$, and the 6-digit number AAABBB satisfy the following equality:

$$\mathrm{AAA} \times \mathrm{AAA} + \mathrm{AAA} = \mathrm{AAABBB}.$$

三位数 AAA (其中 $\mathrm{A} \neq 0$) 及六位数 AAABBB 满足下 列等式：

$$\mathrm{AAA} \times \mathrm{AAA} + \mathrm{AAA} = \mathrm{AAABBB}。$$

(iii) Find A.

求 A。

A =

(iv) Find B.

求 B。

B =

Hong Kong Mathematics Olympiad (1987 – 88)

Event 9 (Group)

香港数学竞赛 (1987 – 88)

决赛项目 9 (团体)

(i) The area of an equilateral triangle is $50\sqrt{12}$. If its perimeter is p, find p.

一正三角形的面积是 $50\sqrt{12}$。若它的周界是 p，求 p。

$p =$

(ii) The average of q, y, z is 14. The average of q, y, z, t is 13. Find t.

q，y，z 的平均数是 14。q，y，z，t 的平均数是 13。求 t。

$t =$

(iii) If $7-24x-4x^2 = K + A(x+B)^2$, where K, A, B are constants, find K.

若 $7-24x-4x^2 = K + A(x+B)^2$，且 K，A，B 是常数，求 K。

$K =$

(iv) If $C = \dfrac{3^{4n}9^{n+4}}{27^{2n+2}}$, find C.

若 $C = \dfrac{3^{4n}9^{n+4}}{27^{2n+2}}$，求 C。

$C =$

Hong Kong Mathematics Olympiad (1987 – 88)
Event 10 (Group)
香港数学竞赛(1987 – 88)
决赛项目 10 (团体)

(i) Each interior angle of an n-sided regular polygon is $160°$. Find n.

一正 n 边形每一内角是 $160°$。求 n。

$n =$

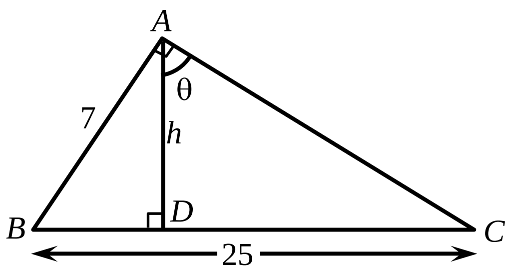
(ii) The n^{th} day of May in a year is Friday. The k^{th} day of May in the same year is Tuesday, where $20 < k < 26$. Find k.

某年五月第 n 日是星期五。同年五月第 k 日是星期 二，且 $20 < k < 26$。求 k。

$k =$

In the figure, $AD \perp BC$, $BA \perp CA$, $AB = 7$, $BC = 25$, $AD = h$ and $\angle CAD = \theta$.

在图中，$AD \perp BC$， $BA \perp CA$， $AB = 7$， $BC = 25$， $AD = h$ 及 $\angle CAD = \theta$。



(iii) If $100\sin\theta = t$, find t.

若 $100\sin\theta = t$，求 t。

$t =$

(iv) Find h.

求 h。

$h =$