Hong Kong Mathematics Olympiad (1991 – 92)

Sample Event (Group)

香港数学竞赛 (1991 – 92)

决赛项目 – 样本 (团体)

Consider the following groups of numbers :

细看下列各组数字：

(2)
(4, 6)
(8, 10, 12)
(14, 16, 18, 20)
(22, 24, 26, 28, 30)
…………………………

(i) Find the last number of the 50^{th} group. [ ]

求第 50 组的最后一个数字。

(ii) Find the first number of the 50^{th} group. [ ]

求第 50 组的第一个数字。

(iii) Find P if the sum of the numbers in the 50^{th} group is $50P$. [$P =$]

若第 50 组的数字之和为 $50P$，求 P。

(iv) Find Q if the sum of the numbers in the 100^{th} group is $100Q$. [$Q =$]

若第 100 组的数字之和为 $100Q$，求 Q。

Hong Kong Mathematics Olympiad (1991 – 92)

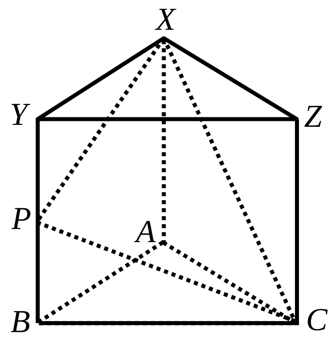
Final Event 6 (Group)

香港数学竞赛 (1991 – 92)

决赛项目 6 (团体)

As shown in the figure, ΔABC and ΔXYZ are equilateral triangles and are ends of a right prism. P is the mid-point of BY and $BP = 3$ cm, $XY = 4$ cm.

如图所示，ΔABC 及 ΔXYZ 为等边三角形，同时亦为一柱体的底和面。P 为 BY 的中点，且 $BP = 3$ cm，$XY = 4$ cm。



(i) If $a = \dfrac{CP}{PX}$, find a.

$a =$

若 $a = \dfrac{CP}{PX}$，求 a。

(ii) If $CX = \sqrt{b}$ cm, find b.

$b =$

若 $CX = \sqrt{b}$ cm，求 b。

(iii) If $\cos \angle PCX = \dfrac{\sqrt{c}}{5}$, find c.

$c =$

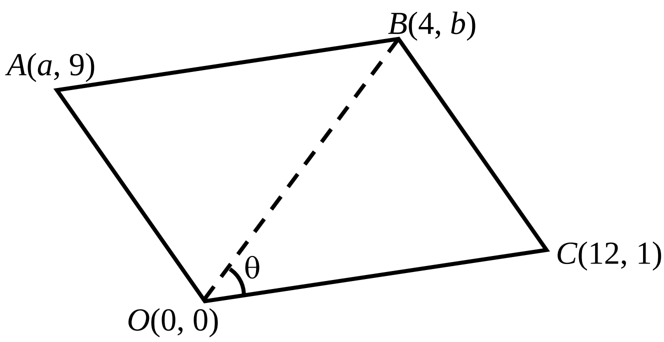
若 $\cos \angle PCX = \dfrac{\sqrt{c}}{5}$，求 c。

(iv) If $\sin \angle PXC = \dfrac{2\sqrt{d}}{5}$, find d.

$d =$

若 $\sin \angle PXC = \dfrac{2\sqrt{d}}{5}$，求 d。

Hong Kong Mathematics Olympiad (1991 – 92)
Final Event 7 (Group)
香港数学竞赛 (1991 – 92)
决赛项目 7 (团体)



Given that *OABC* is a parallelogram.

已知 *OABC* 为一平行四边形。

(i) Find a .

求 a。

$a =$

(ii) Find b .

求 b。

$b =$

(iii) Find the area of *OABC* .

求 *OABC* 的面积。

(iv) Find $\tan\theta$.

求 $\tan\theta$。

Hong Kong Mathematics Olympiad (1991 – 92)

Final Event 8 (Group)

香港数学竞赛 (1991 – 92)

决赛项目 8 (团体)

(i) The area of an equilateral triangle of side A cm is $\sqrt{3}$ cm^2. Find A.

一边长 A cm 的等边三角形之面积为 $\sqrt{3}$ cm^2。求 A.

$A =$

(ii) If $19 \times 243^{\frac{A}{5}} = b$, find b.

若 $19 \times 243^{\frac{A}{5}} = b$，求 b。

$b =$

(iii) The roots of the equation $x^3 - 173x^2 + 339x + 513 = 0$ are -1, b and c. Find c.

方程 $x^3 - 173x^2 + 339x + 513 = 0$ 之根为 -1、b 及 c。求 c。

$c =$

(iv) The base of a triangular pyramid is an equilateral triangle of side $2c$ cm. If the height of the pyramid is $\sqrt{27}$ cm, and its volume is d cm^3, find d.

某三角锥体之底为一边长 $2c$ cm 之等边三角形。若该三角锥体之高为 $\sqrt{27}$ cm，且其体积为 d cm^3，求 d。

$d =$

Hong Kong Mathematics Olympiad (1991 – 92)
Final Event 9 (Group)
香港数学竞赛 (1991 – 92)
决赛项目 9 (团体)

If the area of a regular hexagon $ABCDEF$ is $54\sqrt{3}$ cm^2 and $AB = x$ cm , $AC = y\sqrt{3}$ cm ,

若一正六边形 $ABCDEF$ 之面积为 $54\sqrt{3}$ cm^2，且 $AB = x$ cm，$AC = y\sqrt{3}$ cm，

(i) find x .

求 x。

$x =$

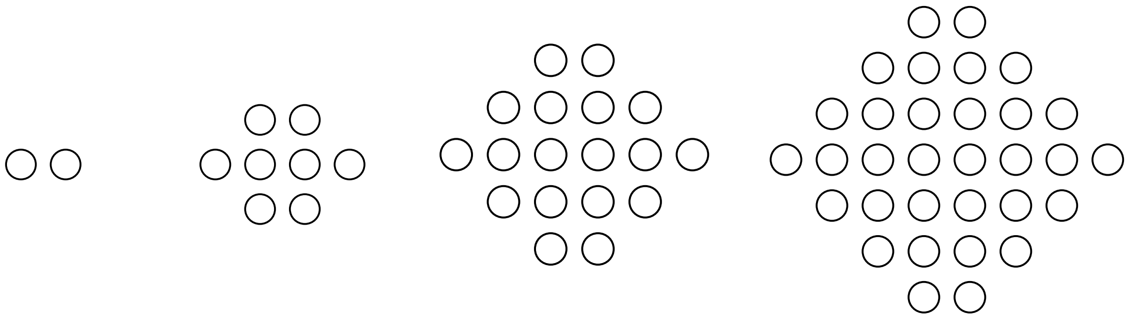
(ii) find y .

求 y。

$y =$

Consider the following number pattern :

细看以下之数形：



$T_1 = 2$　　$T_2 = 8$　　$T_3 = 18$　　$T_4 = 32$

(iii) Find T_{10} .

求 T_{10}。

$T_{10} =$

(iv) If $T_n = 722$, find n .

$n =$

若 $T_n = 722$，求 n。

Hong Kong Mathematics Olympiad (1991 – 92)

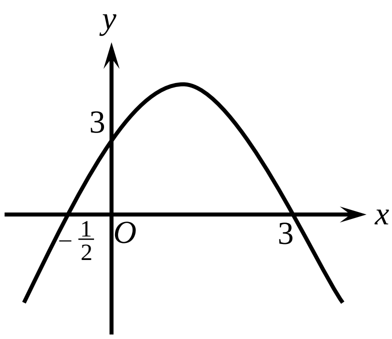
Final Event 10 (Group)

香港数学竞赛 (1991 – 92)

决赛项目 10 (团体)

The following shows the graph of $y = ax^2 + bx + c$.

下图为 $y = ax^2 + bx + c$ 的图形。



(i) Find c . $c =$

求 c。

(ii) Find a . $a =$

求 a。

(iii) Find b . $b =$

求 b。

(iv) If $y = x + d$ is tangent to $y = ax^2 + bx + c$, find d . $d =$

若 $y = x + d$ 为 $y = ax^2 + bx + c$ 的切线，求 d。