Hong Kong Mathematics Olympiad (1985 – 86)

Sample Event (Individual)

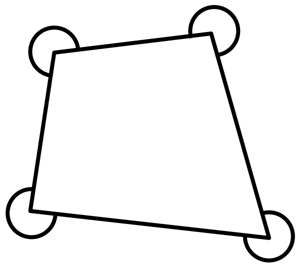
香港數學競賽 (1985 – 86)

決賽項目 – 樣本 (個人)

(i) In the given figure, the sum of the four marked angles is $a°$. Find a.

附圖所示四角之和為 $a°$。 求 a。

$a =$



(ii) The sum of the interior angles of a regular b-sided polygon is $a°$. Find b.

一正 b 邊形之內角和為 $a°$。求 b。

$b =$

(iii) If $b^5 = 32^c$, find c.

若 $b^5 = 32^c$，求 c。

$c =$

(iv) If $c = \log_4 d$, find d.

若 $c = \log_4 d$，求 d。

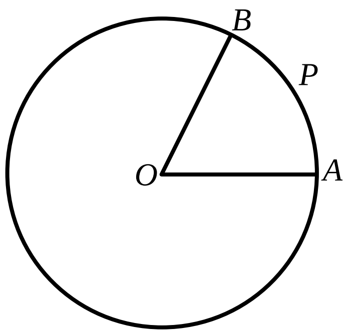
$d =$

Hong Kong Mathematics Olympiad (1985 – 86)
Event 1 (Individual)
香港數學競賽 (1985 – 86)
決賽項目 1 (個人)

(i) The given figure shows a circle of radius 18 cm, centre O. If $\angle AOB=\frac{\pi}{3}$ and the length of arc APB is $a\pi$ cm, find a.

$a =$

附圖所示的圓之半徑為 18 cm，圓心為 O。若 $\angle AOB=\frac{\pi}{3}$，且弧 APB 之長為 $a\pi$ cm，求 a。



(ii) If the solution of the inequality $2x^2-ax+4<0$ is $1<x<b$, find b.

$b =$

若不等式 $2x^2-ax+4<0$ 之解為 $1<x<b$，求 b。

(iii) If $b(2x-5)+x+3\equiv 5x-c$, find c.

$c =$

若 $b(2x-5)+x+3\equiv 5x-c$，求 c。

(iv) The 1ine through $(2, 6)$ and $(5, c)$ cuts the x-axis at $(d, 0)$. Find d.

$d =$

過 $(2, 6)$ 及 $(5, c)$ 之直線與 x-軸相交於 $(d, 0)$。求 d。

Hong Kong Mathematics Olympiad (1985 – 86)

Event 2 (Individual)

香港數學競賽 (1985 – 86)

決賽項目 2 (個人)

(i) If the equation $3x^2-4x+\frac{h}{3}=0$ has equal roots, find h.

$h =$

若方程 $3x^2-4x+\frac{h}{3}=0$ 有等根，求 h。

(ii) If the height of a cylinder is doubled and the new radius is h times the original, then the new volume is k times the original. Find k.

$k =$

若一圓柱體之高增加一倍，且新半徑為原來之 h 倍，則新體積為原來之 k 倍，求 k。

(iii) If $\log_{10}210+\log_{10}k-\log_{10}56+\log_{10}40-\log_{10}120+\log_{10}25=p$, find p.

$p =$

若 $\log_{10}210+\log_{10}k-\log_{10}56+\log_{10}40-\log_{10}120+\log_{10}25=p$，求 p。

(iv) If $\sin A=\frac{p}{3}$ and $\frac{\cos A}{A}=\frac{q}{15}$, find q.

$q =$

若 $\sin A=\frac{p}{3}$ 且 $\frac{\cos A}{A}=\frac{q}{15}$，求 q。

Hong Kong Mathematics Olympiad (1985 – 86)

Event 3 (Individual)

香港數學競賽 (1985 – 86)

決賽項目 3 (個人)

(i) The monthly salaries of 100 employees in a company are as shown :

$m =$

Sa1aries ($)	6000	4000	2500
No. of employees	5	15	80

If the mean salary is $ m, find m.

某公司的一百個員工之月薪如附表所示。若平均月薪為 $ m，求 m。

月薪（$）	6000	4000	2500
員工人數	5	15	80

(ii) If $8\sin^2(m+10)^\circ + 12\cos^2(m+25)^\circ = x$, find x.

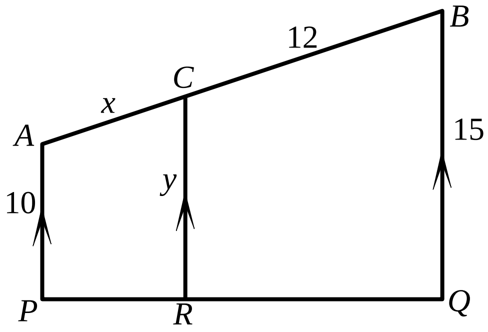
$x =$

若 $8\sin^2(m+10)^\circ + 12\cos^2(m+25)^\circ = x$，求 x。

(iii) In the figure, $AP // CR // BQ$, $AC = x$, $CB = 12$, $AP = 10$, $BQ = 15$ and $CR = y$. Find y.

$y =$

如圖所示，$AP//CR//BQ$，$AC = x$，$CB = 12$，$AP = 10$，$BQ = 15$ 及 $CR = y$。求 y。



(iv) Define $(a\ b\ c) \cdot (p\ q\ r) = ap + bq + cr$, where a, b, c, p, q, r are real numbers. If $(3\ 4\ 5) \cdot (y\ {-2}\ 1) = n$, find n.

$n =$

定義 $(a\ b\ c) \cdot (p\ q\ r) = ap + bq + cr$，其中 a, b, c, p, q, r 為實數。若 $(3\ 4\ 5) \cdot (y\ {-2}\ 1) = n$，求 n。

Hong Kong Mathematics Olympiad (1985 – 86)
Event 4 (Individual)
香港數學競賽 (1985 – 86)
決賽項目 4 (個人)

(i) It is known that

已知

$$\begin{cases} 1 = 1^2 \\ 1+3 = 2^2 \\ 1+3+5 = 3^2 \\ 1+3+5+7 = 4^2 \end{cases}$$

If $1+3+5+\cdots+n = 20^2$, find n.

若 $1+3+5+\cdots+n = 20^2$ ，求 n 。

$n =$

(ii) If the lines $x+2y=3$ and $nx+my=4$ are parallel, find m.

若直線 $x+2y=3$ 及 $nx+my=4$ 平行，求 m。

$m =$

(iii) If a number is selected from the whole numbers 1 to m, and if each number has an equal chance of being selected, the probability that the number is a factor of m is $\frac{p}{39}$, find p.

若由整數 1 至 m 抽出一個數字，而每一數字被抽出之機會均等，被抽出數字為 m 之因數的或然 率為 $\frac{p}{39}$ ， 求 p。

$p =$

(iv) A boy walks from home to school at a speed of p km/h and returns home along the same route at a speed of 3 km/h. If the average speed for the double journey is $\frac{24}{q}$ km/h, find q.

某小童以時速 p km/h 由家步行上學，並依照原來 路線以時速 3 km 步行回家。若來回兩程之平均 時速為 $\frac{24}{q}$ km，求 q。

$q =$

Hong Kong Mathematics Olympiad (1985 – 86)
Event 5 (Individual)
香港數學競賽 (1985 – 86)
決賽項目 5 (個人)

(i) A die is rolled. If the probability of getting a prime number is $\frac{a}{72}$, find a.

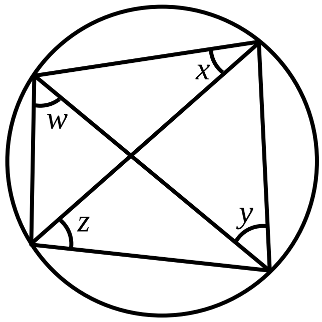
$a =$

投擲一骰子，若擲出質數之或然率為 $\frac{a}{72}$，求 a。

(ii) In the figure, $x = a°$, $y = 44°$, $z = 52°$ and $w = b°$. Find b.

$b =$

如圖所示，$x = a°$，$y = 44°$，$z = 52°$ 及 $w = b°$。 求 b。



(iii) A, B are two towns b km apart. Peter cycles at a speed of 7 km/h from A to B and at the same time John cycles from B to A at a speed of 5 km/h. If they meet after p hours, find p.

$p =$

A，B 兩城相距 b km 。 彼得從 A 城以時速 7 km 踏單車往 B 城，與此同時，約翰從 B 城以時速 5 km 踏單車往 A 城。若兩人於 p 小時後相遇，求 p。

(iv) The base of a pyramid is a triangle with sides 3 cm, p cm and 5 cm. If the height and volume of the pyramid are q cm and 12 cm^3 respectively, find q.

$q =$

一角錐體之底為壹三角形，邊長分別為 3 cm，p cm 及 5 cm。若該角錐體之高及體積依次為 q cm 及 12 cm^3，求 q。