

Hong Kong Mathematics Olympiad (1994 – 95)

Final Event 1 (Individual)

香港數學競賽 (1994 – 95)

決賽項目 1 (個人)

- (i) Find a , if $a = \log_{\frac{1}{4}} \frac{1}{2}$.

$a =$

若 $a = \log_{\frac{1}{4}} \frac{1}{2}$ ，求 a 。

- (ii) In the figure,
 $AB = AD = DC = 4$

$$BD = 2a$$

Find b , the length of BC .

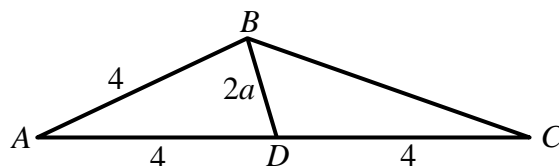
$b =$

如圖示，

$$AB = AD = DC = 4$$

$$BD = 2a$$

若 BC 之長為 b ，求 b 。



- (iii) It is given that $f(x) = px^3 + qx + 5$ and $f(-7) = \sqrt{2}b + 1$. Find c , if $c = f(7)$.

$c =$

已知 $f(x) = px^3 + qx + 5$ 且 $f(-7) = \sqrt{2}b + 1$ 。若 $c = f(7)$ ，求 c 。

- (iv) Find the least positive integer d , such that $d^c + 1000$ is divisible by $10 + c$.

$d =$

若 $d^c + 1000$ 可被 $10 + c$ 所整除，求 d 的最小正整數值。

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Final Event 2 (Individual)

香港數學競賽 (1994 – 95)

決賽項目 2 (個人)

(i) If $\frac{x}{(x-1)(x-4)} = \frac{x}{(x-2)(x-3)}$, find x .

$x =$

若 $\frac{x}{(x-1)(x-4)} = \frac{x}{(x-2)(x-3)}$, 求 x 。

(ii) If $f(t) = 3 \times 52^t$ and $y = f(x)$, find y .

$y =$

若 $f(t) = 3 \times 52^t$ 且 $y = f(x)$ 。求 y 。

(iii) A can finish a job in y days, B can finish a job in $(y+3)$ days. If they worked together, they can finish the job in z days, find z .

$z =$

甲可在 y 日完成某一項工程，乙可在 $(y+3)$ 日完成同一工程。假如甲乙二人合作，可在 z 日完成，求 z 。

(iv) The probability of throwing z dice to score 7 is w , find w .

$w =$

用 z 粒骰子擲得 7 點的概率是 w ，求 w 。

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Final Event 3 (Individual)

香港數學競賽 (1994 – 95)

決賽項目 3 (個人)

- (i) If $a = \sin 30^\circ + \sin 300^\circ + \sin 3000^\circ$, find a .

$a =$

若 $a = \sin 30^\circ + \sin 300^\circ + \sin 3000^\circ$ ，求 a 。

- (ii) It is given that $\frac{x+y}{2} = \frac{z+x}{3} = \frac{y+z}{4}$ and $x+y+z = 36a$. Find the value of b , if $b = x+y$.

$b =$

已知 $\frac{x+y}{2} = \frac{z+x}{3} = \frac{y+z}{4}$ 且 $x+y+z = 36a$ 。求 b 之值，若 $b = x+y$ 。

- (iii) It is given that the equation $x+6+8k = k(x+b)$ has positive integral solution. Find c , the least value of k .

$c =$

已知方程 $x+6+8k = k(x+b)$ 有正整數解。求 k 的最小值 c 。

- (iv) A car has already travelled 40% of its journey at an average speed of $40c$ km/h. In order to make the average speed of the whole journey become 100 km/h, the speed of the car is adjusted to d km/h to complete the rest of the journey. Find d .

$d =$

一輛汽車以平均時速 $40c$ km/h 完成了旅程的 40 %。為著使全程的平均速度為 100 km/h，車速被調至 d km/h 行畢全程。求 d 。

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Final Event 4 (Individual)

香港數學競賽 (1994 – 95)

決賽項目 4 (個人)

- (i) In triangle ABC , $\angle B = 90^\circ$, $BC = 7$ and $AB = 24$. If r is the radius of the inscribed circle, find r .

在三角形 ABC 中， $\angle B = 90^\circ$ ， $BC = 7$ 且 $AB = 24$ 。若 r 為內切圓之半徑，求 r 。



$r =$

- (ii) If $x^2 + x - 1 = 0$ and $s = x^3 + 2x^2 + r$, find s .

若 $x^2 + x - 1 = 0$ 且 $s = x^3 + 2x^2 + r$ ，求 s 。

$s =$

- (iii) It is given that $F_1 = F_2 = 1$ and $F_n = F_{n-1} + F_{n-2}$, where $n \geq 3$. If $F_t = s + 1$, find t .

已知 $F_1 = F_2 = 1$ 且 $F_n = F_{n-1} + F_{n-2}$ ，其中 $n \geq 3$ 。若 $F_t = s + 1$ ，求 t 。

$t =$

- (iv) If $u = \sqrt{t(t+1)(t+2)(t+3)+1}$, find u .

若 $u = \sqrt{t(t+1)(t+2)(t+3)+1}$ ，求 u 。

$u =$

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Final Event 5 (Individual)

香港數學競賽 (1994 – 95)

決賽項目 5 (個人)

- (i) It is given that $\log_7(\log_3(\log_2 x)) = 0$. Find a , if $a = x^{\frac{1}{3}}$.

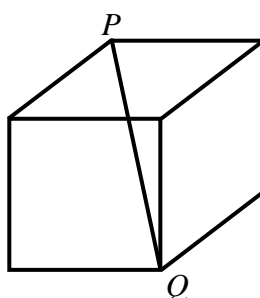
$a =$

已知 $\log_7(\log_3(\log_2 x)) = 0$ 。若 $a = x^{\frac{1}{3}}$ ，求 a 。

- (ii) In the figure, PQ is a diagonal of the cube and $PQ = \frac{a}{2}$. Find b , if b is the total surface area of the cube.

$b =$

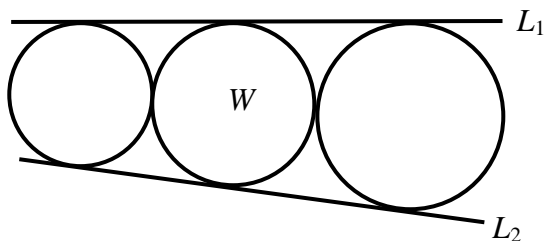
如圖示， PQ 是正方體的一條對角線，且 $PQ = \frac{a}{2}$ 。若 b 為此正方體的總表面積，求 b 。



- (iii) In the figure, L_1 and L_2 are tangents to the three circles. If the radius of the largest circle is 18 and the radius of the smallest circle is $4b$, find c , where c is the radius of the circle W .

$c =$

如圖示， L_1 、 L_2 為三個圓的切線。如果最大圓的半徑是 18，最小圓半徑是 $4b$ ，求 c 若 c 為圓 W 的半徑。



- (iv) Refer to the figure, $ABCD$ is a rectangle. $AE \perp BD$ and $BE = EO = \frac{c}{6}$. Find d , the area of the rectangle $ABCD$.

$d =$

如圖， $ABCD$ 為一長方形。 $AE \perp BD$ 且 $BE = EO = \frac{c}{6}$ 。求長方形 $ABCD$ 之面積 d 。

