Hong Kong Mathematics Olympiad (1992 – 93)
Final Event 1 (Individual)
香港数学竞赛 (1992 – 93)
决赛项目 1 (个人)

(i) Given that $7^{2x}=36$ and $7^{-x}=(6)^{-\frac{a}{2}}$, find the value of a.

$a=$

已知 $7^{2x}=36$ 及 $7^{-x}=(6)^{-\frac{a}{2}}$，求 a 的值。

(ii) Find the value of b if $\log_2\left\{\log_2\left[\log_2(2b)+a\right]+a\right\}=a$.

$b=$

若 $\log_2\left\{\log_2\left[\log_2(2b)+a\right]+a\right\}=a$，求 b 的值。

(iii) If c is the total number of positive roots of the equation $(x-b)(x-2)(x+1)=3(x-b)(x+1)$, find the value of c.

$c=$

若方程 $(x-b)(x-2)(x+1)=3(x-b)(x+1)$ 正根的总数为 c，求 c 的值。

(iv) If $\sqrt{3-2\sqrt{2}}=\sqrt{c}-\sqrt{d}$, find the value of d.

$d=$

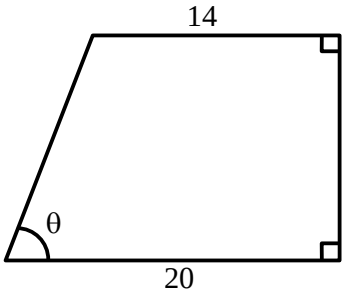
若 $\sqrt{3-2\sqrt{2}}=\sqrt{c}-\sqrt{d}$，求 d 的值。

Hong Kong Mathematics Olympiad (1992 – 93)
Final Event 2 (Individual)
香港数学竞赛 (1992 – 93)
决赛项目 2 (个人)

(i) If $\sin\theta = \frac{4}{5}$, find a , the area of the quadrilateral .

$a =$

若 $\sin\theta = \frac{4}{5}$，求四边形面积 a。



(ii) If $b = 126^2 - a^2$, find b .

$b =$

若 $b = 126^2 - a^2$，求 b。

(iii) Dividing \$ (3000 + b) in a ratio 5 : 6 : 8, the smallest part is \$ c . Find c .

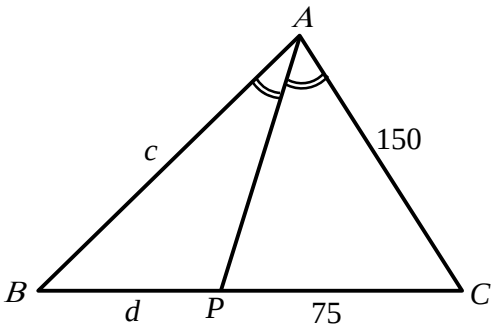
$c =$

将 \$ (3000 + b) 按 5 : 6 : 8 分成 3 份，最小的一份为 \$ c。求 c。

(iv) In the figure, AP bisects $\angle BAC$. Given that $AB = c$, $BP = d$, $PC = 75$ and $AC = 150$, find d .

$d =$

图中 AP 等分 $\angle BAC$。已知 $AB = c$， $BP = d$， $PC = 75$ 及 $AC = 150$，求 d。



Hong Kong Mathematics Olympiad (1992 – 93)
Final Event 3 (Individual)
香港数学竞赛 (1992 – 93)
决赛项目 3 (个人)

(i) If a is the remainder when 2614303940317 is divided by 13, find a.

$a =$

若 a 为以 13 除 2614303940317 的余数，求 a。

(ii) Let $P(x, b)$ be a point on the straight line $x + y = 30$ such that slope of $OP = a$ (O is the origin). Determine b.

$b =$

设 $P(x, b)$ 为直线 $x + y = 30$ 上的点且满足 OP 斜率为 a (O 乃原点)。求 b。

(iii) Two cyclists, initially $(b + 26)$ km apart travelling towards each other with speeds 40 km/h and 60 km/h respectively. A fly flies back and forth between their noses at 100 km/h. If the fly flied c km before crushed between the cyclists, find c.

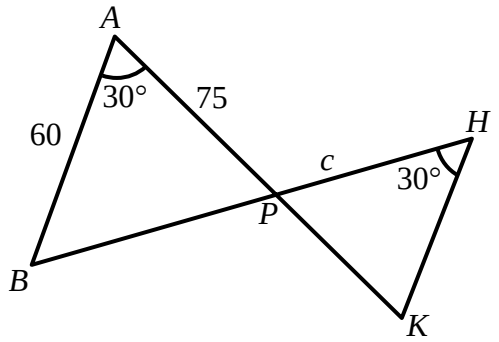
$c =$

两人踏单车，起始时相距 $(b + 26)$ km，以时速 40 km/h 及 60 km/h 相向而行。一苍蝇以时速 100 km/h 往返两人鼻尖，若牠在两人碰上前共飞 c km，求 c。

(iv) In the figure, APK and BPH are straight lines. If $d =$ area of triangle HPK, find d.

$d =$

图中 APK 及 BPH 为直线。若 $d = \Delta HPK$ 的面积，求 d。



Hong Kong Mathematics Olympiad (1992 – 93)
Final Event 4 (Individual)
香港数学竞赛 (1992 – 93)
决赛项目 4 (个人)

(i) Given that the means of x and y, y and z, z and x are respectively 5, 9, 10. If a is the mean of x, y, z, find the value of a.

$a =$

已知 x 和 y、y 和 z、z 和 x 的平均值分别为 5、9、10。若 x、y、z 的平均值是 a，求 a 的值。

(ii) The ratio of two numbers is $5:a$. If 12 is added to each of them, the ratio becomes $3:4$. If b is the difference of the original numbers and $b>0$, find the value of b.

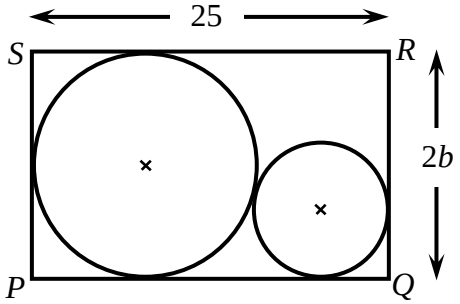
$b =$

某两数的比例为 $5:a$。当每边加 12 时，两数的比例变为 $3:4$。若 b 为原本两数之差及 $b>0$，求 b 的值。

(iii) $PQRS$ is a rectangle. If c is the radius of the smaller circle, find the value of c.

$c =$

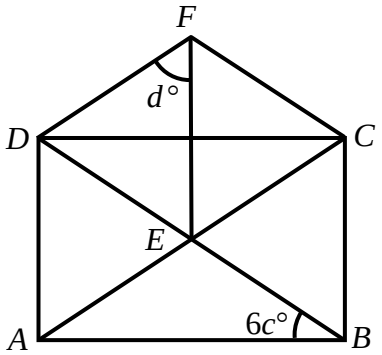
$PQRS$ 为一长方形，若细圆的半径为 c，求 c 的值。



(iv) $ABCD$ is a rectangle and CEF is an equilateral triangle, $\angle ABD = 6c°$, find the value of d.

$d =$

$ABCD$ 为一长方形及 CEF 为一等边三角形，$\angle ABD = 6c°$，求 d 的值。



Hong Kong Mathematics Olympiad (1992 – 93)
Final Event 5 (Individual)
香港数学竞赛 (1992 – 93)
决赛项目 5 (个人)

(i) Two opposite sides of a rectangle are increased by 50% while the other two are decreased by 20%. If the area of the rectangle is increased by $a\%$, find a.

$a =$

长方形两对边同时加长 50%，而其余两对边则缩短 20%。若长方形的面积增加 $a\%$，求 a。

(ii) Let $f(x) = x^3 - 20x^2 + x - a$ and $g(x) = x^4 + 3x^2 + 2$. If $h(x)$ is the highest common factor of $f(x)$ and $g(x)$, find $b = h(1)$.

$b =$

设 $f(x) = x^3 - 20x^2 + x - a$ 及 $g(x) = x^4 + 3x^2 + 2$。若 $h(x)$ 为 $f(x)$ 和 $g(x)$ 的最大公因子，求 $b = h(1)$。

(iii) It is known that $b^{16} - 1$ has four distinct prime factors, determine the largest one, denoted by c.

$c =$

已知 $b^{16} - 1$ 共有四质因子，求其中最大的一个，以 c 表它。

(iv) When c is represented in binary scale, there are d '0's. Find d.

$d =$

当以二进制表示 c，则其中有 d 个 '0'。求 d。