

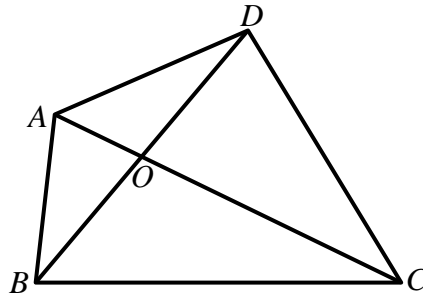
Hong Kong Mathematics Olympiad (1994 – 95)
Heat Event (Group)
香港数学竞赛(1994 – 95)
初赛项目 (团体)

1. Find the number of positive integral solutions of the equation $x^3 + (x+1)^3 + (x+2)^3 = (x+3)^3$.

求方程 $x^3 + (x+1)^3 + (x+2)^3 = (x+3)^3$ 的正整数解个数。

2. In the figure, $ABCD$ is a quadrilateral whose diagonals intersect at O . If $\angle AOB = 30^\circ$, $AC = 24$ and $BD = 22$, find the area of the quadrilateral $ABCD$.

下图中, 四边形 $ABCD$ 的对角线交于 O 。若 $\angle AOB = 30^\circ$ 、 $AC = 24$ 及 $BD = 22$, 求四边形 $ABCD$ 的面积。



3. Given that $\frac{1}{n} + \frac{2}{n} + \frac{3}{n} + \dots + \frac{n-1}{n} = \frac{n-1}{2}$, find the value of $\frac{1}{2} + \left(\frac{1}{3} + \frac{2}{3}\right) + \left(\frac{1}{4} + \frac{2}{4} + \frac{3}{4}\right) + \dots + \left(\frac{1}{10} + \dots + \frac{9}{10}\right)$.

已知 $\frac{1}{n} + \frac{2}{n} + \frac{3}{n} + \dots + \frac{n-1}{n} = \frac{n-1}{2}$, 求 $\frac{1}{2} + \left(\frac{1}{3} + \frac{2}{3}\right) + \left(\frac{1}{4} + \frac{2}{4} + \frac{3}{4}\right) + \dots + \left(\frac{1}{10} + \dots + \frac{9}{10}\right)$ 的值。

4. Suppose x and y are positive integers such that $x^2 = y^2 + 2000$, find the least value of x .

若 x 及 y 为正整数, 且 $x^2 = y^2 + 2000$, 求 x 的最小值。

5. Given that 37^{100} is a 157-digit number, and 37^{15} is an n -digit number. Find n .

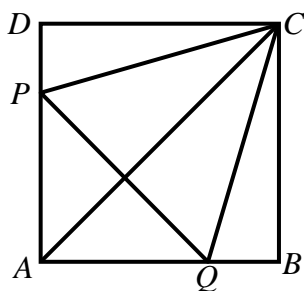
已知 37^{100} 为一 157 位数, 且 37^{15} 为一 n 位数, 求 n 。

6. Given that $1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n}{6}(n+1)(2n+1)$, find the value of $19 \times 21 + 18 \times 22 + 17 \times 23 + \cdots + 1 \times 39$.

已知 $1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n}{6}(n+1)(2n+1)$, 求 $19 \times 21 + 18 \times 22 + 17 \times 23 + \cdots + 1 \times 39$ 的值。

7. In the figure, $ABCD$ is a square where $AB = 1$ and CPQ is an equilateral triangle. Find the area of $\triangle CPQ$.

在图中, $ABCD$ 为一正方形, 且 $AB = 1$ 及 CPQ 为一等边三角形。求 $\triangle CPQ$ 的面积。

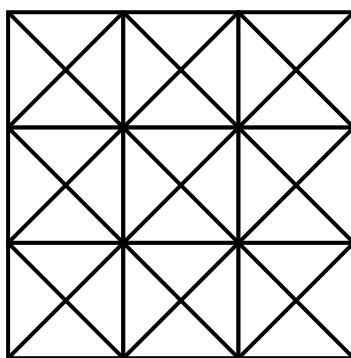


8. The number of ways to pay a sum of \$17 by using \$1 coins, \$2 coins and \$5 coins is n . Find n . (Assume that all types of coins must be used each time.)

用一元、二元及五元硬币, 以凑合十七元, 且每次均须使用各种硬币, 其方法有 n 种, 求 n 。

9. In the figure, find the total number of triangles in the 3×3 square.

下图是一个 3×3 的正方形, 求图中三角形的总数。



10. In the figure, the radius of the quadrant and the diameter of the large semi-circle is 2. Find the radius of the small semi-circle.

在图中，象限的半径和大半圆的直径是 2，求小半圆的半径。

