

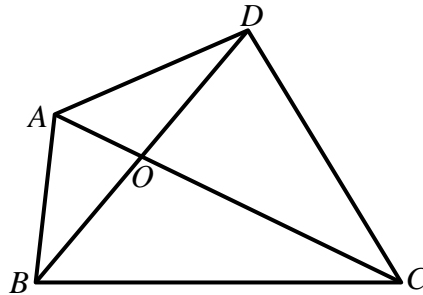
Hong Kong Mathematics Olympiad (1994 – 95)
Heat Event (Group)
香港數學競賽(1994 – 95)
初賽項目(團體)

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 $x^3 + (x+1)^3 + (x+2)^3 = (x+3)^3$ 的正整數解個數。

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 $ABCD$.

下圖中，四邊形 $ABCD$ 的對角線交於 O 。若 $\angle AOB = 30^\circ$ 、 $AC = 24$ 及 $BD = 22$ ，求四邊形 $ABCD$ 的面積。



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

已知 $\frac{1}{n} + \frac{2}{n} + \frac{3}{n} + \cdots + \frac{n-1}{n} = \frac{n-1}{2}$ ，求 $\frac{1}{2} + \left(\frac{1}{3} + \frac{2}{3}\right) + \left(\frac{1}{4} + \frac{2}{4} + \frac{3}{4}\right) + \cdots + \left(\frac{1}{10} + \cdots + \frac{9}{10}\right)$ 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 為正整數，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 .

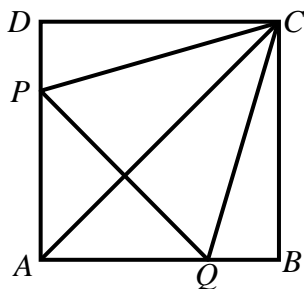
已知 37^{100} 為一 157 位數，且 37^{15} 為一 n 位數，求 n 。

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 $\triangle CPQ$.

在圖中， $ABCD$ 為一正方形，且 $AB = 1$ 及 CPQ 為一等邊三角形。求 $\triangle CPQ$ 的面積。

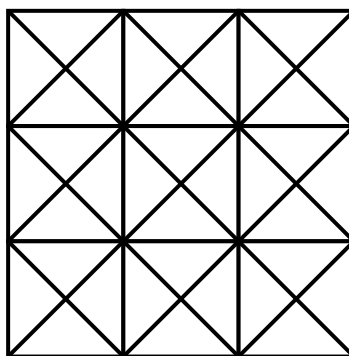


8. The number of ways to pay a sum of \$17 by using \$1 coins, \$2 coins and \$5 coins is n . Find n . (Assume that all types of coins must be used each time.)

用一元、二元及五元硬幣，以湊合十七元，且每次均須使用各種硬幣，其方法有 n 種，求 n 。

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

下圖是一個 3×3 的正方形，求圖中三角形的總數。



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.

在圖中，象限的半徑和大半圓的直徑是 2，求小半圓的半徑。

