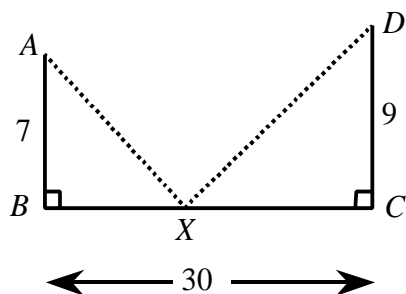


Hong Kong Mathematics Olympiad (1992 – 93)
Heat Event (Individual)
香港数学竞赛(1992 – 93)
初赛项目 (个人)

1. X is a point on the line segment BC as shown in figure 1. If $AB = 7$, $CD = 9$ and $BC = 30$, find the minimum value of $AX + XD$.

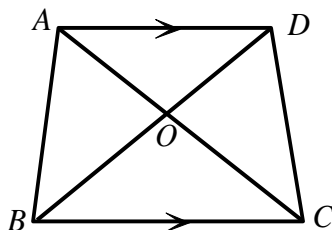
在图 1 中, X 为 BC 上一点。已知 $AB = 7$, $CD = 9$ 及 $BC = 30$, 求 $AX + XD$ 的最小值。



(Figure 1) (图 1)

2. In quadrilateral $ABCD$, $AD \parallel BC$, and AC , BD intersect at O (as shown in figure 2). Given that area of $\triangle BOC = 36$, area of $\triangle AOD = 25$, determine the area of the quadrilateral $ABCD$.

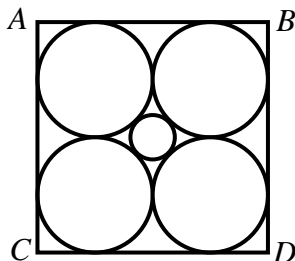
在图 2 中, $ABCD$ 为一四边形, 其中 $AD \parallel BC$, 而 AC 、 BD 交于 O 。已知 $\triangle BOC$ 的面积 = 36, $\triangle AOD$ 的面积 = 25, 求四边形 $ABCD$ 的面积。



(Figure 2) (图 2)

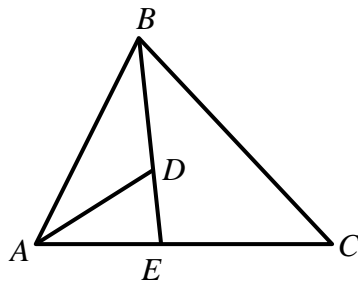
3. In figure 3, $ABCD$ is a square of side $8(\sqrt{2} + 1)$. Find the radius of the small circle at the centre of the square.

在图 3 中, $ABCD$ 是个边长 $8(\sqrt{2} + 1)$ 的正方形。求正方形中间小圆的半径。



(Figure 3) (图 3)

4. Thirty cards are marked from 1 to 30 and one is drawn at random. Find the probability of getting a multiple of 2 or a multiple of 5.
从分别写上 1 到 30 的三十张纸牌中随意抽取一张。求点数是 2 或 5 的倍数的概率。
5. The areas of three different faces of a rectangular box are 120, 72 and 60 respectively. Find its volume.
一长方形盒子的三面不同面的面积分别为 120、72 和 60。求盒子的体积。
6. For any positive integer n , it is known that $1^2 + 2^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$. Find the value of $12^2 + 14^2 + 16^2 + \cdots + 40^2$.
已知对任何正整数 n , $1^2 + 2^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$ 。求 $12^2 + 14^2 + 16^2 + \cdots + 40^2$ 的值。
7. If x and y are prime numbers such that $x^2 - y^2 = 117$, find the value of x .
若 x 和 y 为质数, 且满足 $x^2 - y^2 = 117$, 求 x 的值。
8. If m is the total number of positive divisors of 54 000, find the value of m .
若 54000 的正因子有 m 个, 求 m 的值。
9. If a is a real number such that $a^2 - a - 1 = 0$, find the value of $a^4 - 2a^3 + 3a^2 - 2a + 10$.
若 a 为一实数, 且 $a^2 - a - 1 = 0$, 求 $a^4 - 2a^3 + 3a^2 - 2a + 10$ 的值。
10. In figure 4, BDE and AEC are straight lines, $AB = 2$, $BC = 3$, $\angle ABC = 60^\circ$, $AE : EC = 1 : 2$. If $BD : DE = 9 : 1$ and area of $\triangle DBA = \frac{a\sqrt{3}}{20}$, find the value of a .
在图 4 中, BDE 及 AEC 为直线、 $AB = 2$ 、 $BC = 3$ 、 $\angle ABC = 60^\circ$ 、 $AE : EC = 1 : 2$ 。若 $BD : DE = 9 : 1$ 及三角形 DBA 的面积为 $\frac{a\sqrt{3}}{20}$, 求 a 的值。



(Figure 4) (图 4)