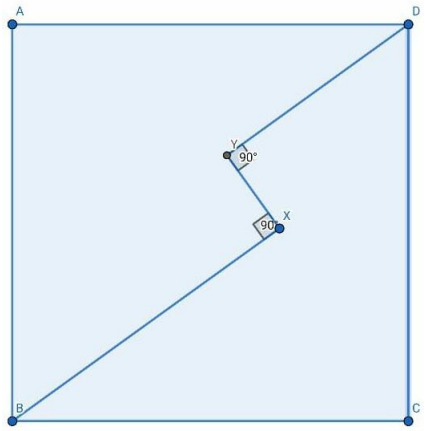
Wild Card

W.1 Problem 1

Let $ABCD$ be a square and BX and DY be two parallel lines such that $XY \perp BX$. Also, $BX = 12$, $XY = 3$ and $DY = 9$.
Compute the side length of the square $ABCD$.



W.2 Problem 2

Compute

$$\sum_{1 \le x < y < z} \frac{1}{2^x 3^y 5^z}, \quad x, y, z \in \mathbb{N}$$

W.3 Problem 3

Let $F(x)$ be a k-degree polynomial with integer coefficients such that $F(x) = c_0 + c_1 x + c_2 x^2 + ... + c_k x^k$ and $0 \le c_i \le 3 \ \forall \ i \in [0, 3] \cap \mathbb{Z}$. Given that $F(\sqrt{3}) = 20 + 17\sqrt{3}$, compute $F(2)$.