1. P is a point inside the triangle ABC. D, E, F are the feet of the perpendicualrs from P to the lines BC, CA, AB respectively. Find all P which minimise:

\[ \frac{BC}{PD} + \frac{CA}{PE} + \frac{AB}{PF}. \]

2. Take r such that 1 \leq r \leq n, and consider all subsets of r elements of the set \{1, 2, \ldots, n\}. Each subset has a smallest element. Let F(n,r) be the arithmetic mean of these smallest elements. Prove that:

\[ F(n,r) = \frac{(n+1)}{(r+1)}. \]

3. Determine the maximum value of \(m^2 + n^2\), where m and n are integers in the range 1, 2, \ldots, 1981 satisfying \((n^2 - mn - m^2)^2 = 1\).

4. (a) For which \(n > 2\) is there a set of \(n\) consecutive positive integers such that the largest number in the set is a divisor of the least common multiple of the remaining \(n-1\) numbers?

(b) For which \(n > 2\) is there exactly one set having this property?

5. Three circles of equal radius have a common point O and lie inside a given triangle. Each circle touches a pair of sides of the triangle. Prove that the incenter and the circumcenter of the triangle are collinear with the point O.

6. The function \(f(x,y)\) satisfies: \(f(0,y) = y + 1\), \(f(x+1,0) = f(x,1)\), \(f(x+1,y+1) = f(x,f(x+1,y))\) for all non-negative integers \(x, y\). Find \(f(4, 1981)\).