



Individual Finals B

1. Let A, B be two points on circle γ . At point A and B we construct tangents to γ , AC and BD respectively such that the tangents are both in the clockwise direction. Let the intersection between AB and CD be P . If $AC = BD$, prove that P bisects the line CD .
2. Let P_1, P_2, \dots, P_n be points on the plane. There is an edge between distinct points P_x, P_y if and only if $x|y$. Find the largest n , such that the graph can be drawn with no crossing edges.
3. Solve the following equation for $x, y \in \mathbb{N}$

$$x^3 + y^3 = 101xy + 101$$