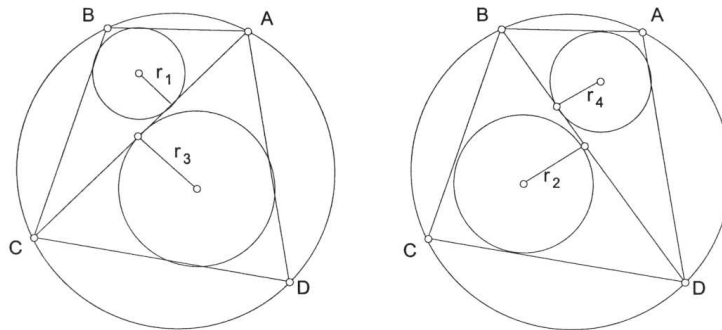


**JAPANESE THEOREM: A LITTLE KNOWN THEOREM
WITH MANY PROOFS. (PART II)**

Mangho Ahuja, Wataru Uegaki, and Kayo Matsushita

1. Later Attempts. By early 20th century Japanese mathematics had flourished and papers by Japanese mathematicians began to appear in western journals. In a 1906 paper in *Mathesis* [4], Prof. T. Hayashi conveyed no less than five different proofs of our theorem by Japanese mathematicians. To exhibit the rich variety of approaches to the theorem, all five proofs are presented here. While some proofs are easy, and others require a little patience, they all testify to the level of sophistication of Japanese mathematics at that time. Readers should refer to Part I for results (E1) to (E5) and (G1) to (G8).

Japanese Theorem (Quadrilateral Case). Let $ABCD$ be a quadrilateral inscribed in a circle. Let r_1 , r_2 , r_3 , and r_4 be the radii of the circles C_1 , C_2 , C_3 , and C_4 inscribed in the triangles ABC , BCD , CDA , and DAB , respectively. Then $r_1 + r_3 = r_2 + r_4$.



Nagasawa's Proof. (Kamenosuke Nagasawa was born in 1860 and graduated from college in 1878. He had written 150 books and translations before his death in 1927.)