Factorizing Polynomials Part 1

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Problems

A A basic geometric proof

Let α, β, γ, δ and ϵ be the angles of a pentagon whose vertices are arranged into any arbitrary star like shape. Let θ be the sum of the these angles. Is θ constant, and if it's not, then why?

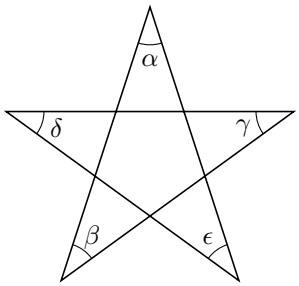

Figure 1: The aforementioned pentagon whose sum of angles is sought after.

Solution

Let's begin by imagining the angles created by the points of intersection of our star's sides and the inner pentagon formed by these points of intersection. We will call these angles a_1 and a_2 for a through e, with the first angles defined as the angles of the interior pentagon and the second angles defined as the exterior angles.

We know that a pair of angles, a_1 and a_2, will equal 180°, since they lie on a line, making a straight angle. The sum of all angles a_1-e_1 and a_2-e_2 will therefore equal 540°.