

Exercise 1

Given a triangulation of a polygon P , three consecutive vertices a, b, c of P form an *ear* if ac is a diagonal of the triangulation. The vertex b is called the *ear tip*. Show that every triangulation of a polygon with more than three vertices has at least two ears.

Exercise 2

Let P be a polygon with n vertices. Show the following properties:

- (i) the sum of the interior angles is $\pi(n - 2)$.
- (ii) the total turn angle around the boundary of P is 2π . Here, the turn angle at a vertex v is π minus the internal angle at v .

Exercise 3

Show that every polygonal region with polygonal holes admits a triangulation of its interior.

Exercise 4

Let P be a polygon with h holes and n total vertices (including hole vertices). Find a formula for the number of triangles in any triangulation of P .