

CS133 - Winter 2002 - Quiz 1 - Solutions

1. How many diagonals a triangulation of a polygon P with n vertices uses?

From Lemma 1.2.4: $n - 3$ diagonals.

2. Prove your answer in 1.

Proof of Lemma 1.2.4.

3. How many ears does a polygon of n vertices have?

A polygon of $n \geq 4$ vertices has at least 2 ears (Theorem 1.2.7).

4. How can you use this fact to design a polygon triangulation algorithm?

The idea is to find an ear, and remove it. This creates a triangle, and a polygon with $n - 1$ vertices. If $n - 1 \geq 4$, this also has at least two ears.

The algorithm is in Section 1.6.5.

5. What is the area of the following polygon?

Use the formula of Theorem 1.3.3.