**Problem 2.** For a shape $S$ on the plane, let the width of $S$ be the maximum value of the distance between two points on its boundary. Set

$$\pi(S) = \frac{\text{perimeter of } S}{\text{width of } S}.$$  

(i) Find the range of all possible values $\pi(S)$ for triangles $S$ and the shape for which the maximum possible value is attained.

(ii) Find the range of all possible values $\pi(S)$ for convex quadrilaterals $S$ and the shape for which the maximum possible value is attained.