**Exercise 1 (Convex Sets, 5 Credits)**

Show that a convex set $K$ and a line can intersect in at most one contiguous interval. In other words, the border of $K$ and the line can have at most 1 or 2 intersection points. (In the case of 1 intersection point, the line is called a **tangent**.)

**Exercise 2 (Convex Hulls, 5 Credits)**

Provide a non-inductive proof that the convex hull $C H(P)$ over a finite set $P$ of points in $\mathbb{R}^2$ has a subset of $P$ as vertices. Hint: you could use the fact that the intersection of convex sets is convex, and you could try to find a suitable set of convex sets, the intersection of which yields $C H(P)$.

**Exercise 3 (Graham’s Scan, 5 Credits)**

Show that the algorithm Graham’s Scan can handle input points with equal x-coordinate without any changes. Which case needs special treatment?

**Exercise 4 (Clarkson-Shoe Algorithm, 5 Credits)**

Given an edge $e$ with adjacent triangles $f_1$ and $f_2$. Give the geometric predicate for $e$ being a silhouette edge with respect to some point $p_r$. (One of the geometric predicate needed in the Clarkson-Shoe algorithm.)