Exercise 1

Draw the Voronoi diagram $\mathrm{Vor}(P)$ for $P = \{(1,3),(1,9),(1,11),(3,6),(4,9),(6,6)\}$.

Exercise 2

Let P be a set of points in the plane and $\mathrm{Vor}(P)$ be its Voronoi diagram. Show that a Voronoi region $\mathcal{V}(p)$ for $p \in P$ is unbounded if and only if p is on the hull of P.

Exercise 3

Let P be a set of points in the plane and $\mathrm{Vor}(P)$ be its Voronoi diagram. Show that the average number of edges among the Voronoi regions is less than 6.

Exercise 4

Given four points p, q, r, s in the plane, prove that s lies in the interior of the circle through p, q, r if and only if the following condition holds. Assume that p, q, r form the vertices of a triangle in clockwise order.

$$\begin{vmatrix} p_x & p_y & p_x^2 + p_y^2 & 1 \\ q_x & q_y & q_x^2 + q_y^2 & 1 \\ r_x & r_y & r_x^2 + r_y^2 & 1 \\ s_x & s_y & s_x^2 + s_y^2 & 1 \end{vmatrix} < 0$$