(a) Describe in detail an algorithm that returns the minimum distance from a point to a line segment in two dimensions. Ensure that you include all of your assumptions and all necessary mathematical calculations.

(b) A quadratic Bézier curve is defined by three points, $P_1$, $P_2$, $P_3$, and a parameter, $t$:

$$P(t) = (1 - t)^2 P_1 + 2t(1 - t) P_2 + t^2 P_3, \quad 0 \leq t \leq 1$$

Describe an algorithm that draws the quadratic Bézier curve, using straight lines only, to within a tolerance $\tau$. You may use the algorithm from part (a) and you may assume that you already have an algorithm for drawing a straight line.

(c) Consider the control of detail in a curve that is represented by a sequence of many straight line segments. Describe how Douglas and Pucker’s algorithm can be used to remove superfluous points. You may use the algorithm from part (a).