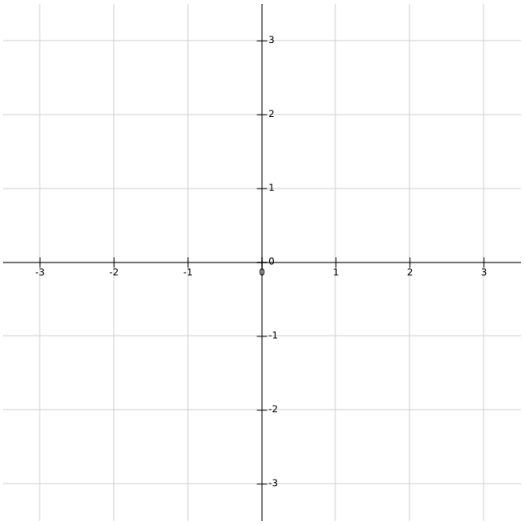
COMPUTER SCIENCE TRIPOS Part IB 75%, Part II 50% – 2020 – Paper 7

7 Further Graphics (pb355)

(*a*) Consider the set **C** of 2D control points:
C = { $(0,0)$, $(0,2)$, $(2,1)$, $(2,-1)$, $(-2,-1)$, $(-2,1)$ }



On 3 separate 2D graph plots, each ranging from $(-3,-3)$ to $(3,3)$,

(*i*) Draw the *Voronoi diagram* of **C** [2 marks]

(*ii*) Draw the *Delaunay triangulation* of **C** [2 marks]

(*iii*) Draw the *empty circles* of the *Voronoi points* of **C** [2 marks]

(*iv*) What is the first value in the *equiangularity* of **C**? [3 marks]

(*v*) What is the (X,Y) position of the Voronoi point of **C** with the most negative Y coordinate? [3 marks]

(*b*) Using pseudocode, give an algorithm for finding the Delaunay triangulation of a set of 2D points **S**. [4 marks]

(*c*) Explain why the empty circles around the Voronoi points of a Voronoi diagram are, in fact, empty. [4 marks]