**WRITE UP**

Part b) A\* works by a true cost and a heuristic. In the grid provided, the algorithm seems to prefer straight lines over diagonal ones (it preferred b2 over c2). In the end, the path that the algorithm followed was Start = a4 -> b3 -> b2 -> c1 which is the goal. The heuristics hence, complete the path in just three moves in the A\* algorithm.

Theta\* works in a different way in that it uses its parents and given the heuristic value in the question, it considers the distance between the start and the goal as the heuristic in the start which changes the path of the agent in the grid. The new path is Start = a4 -> a3 -> b2 -> c1 which is the goal. Here, the algorithm prefers the straight line too but has a tie between b3 and a2 in the first step. We chose a2 because of the visibility graph from that point to the goal.

Part e) We know that if h(n ) is consistent, then f(n) is a non-decreasing along any path. Proving A\* is admissible (that is, it is guaranteed to return the shortest path in a grid), is simply proving that f(n’) >= f(n) which is showcased in the project write-up. We Consider g(n’) (where n’ is the next node). Equalling it to the distance between the node and the next node plus the heuristics value of that node, we can consider g(n’) as f(n’). After that, we simply substitute the g(n) + c(n,a,n’) + h(n’) as f(n’). Since f(n’) >= f(n), we can consider f(n’) >= f(n). Hence, A\* is always admissible.