Question 2 part b:

Sorted: 1000: 0.115s 2000: 0.118s 3000: 0.127s 4000: 0.141s 5000: 0.164s

Random: 1000: 0.113s 2000: 0.114s 3000: 0.117s 4000: 0.118s 5000: 0.119s

Adding random values will most likely result in a balanced binary search tree which results in insertions having logarithmic cost. As shown by the results of the random insertions, the increase in time needed to run the function incremented by extremely small amounts. This reflects the shape of a logarithmic curve. Compared to adding sorted values into a binary search tree, the tree will be imbalanced because each inserted value will become a right child of its parent. The function will be checking if the inserted integer can be a left child, but it will never be and thus result in added time. Due to this scenario, the cost of each insertion is linear, but because n is the number of insertions the total cost of the insert function will be quadratic (O n^2). As shown in the sorted insertion data, the time needed to run the function takes longer and longer as the number of insertions increases.