In Class Activity – Local Search (ICA6)

Please solve the following problems and enter your responses at https://tinyurl.com/AIF19-ICA6

1. You are given a maximization problem with a search space of size 10^{12}. You decide to tackle it by running Steepest Ascent Hill Climbing 1000 times, each time with a randomly selected starting point (i.e., random restarts). The lowest value produced over your 1000 runs is 1.3, the highest value is 4.9, and the average is 3.2. The algorithm on average takes 5 steps to converge.
    a. What value will the algorithm return as the final result?
    b. Is the returned value more likely to be a local or global optimum?

2. Consider the following table from different instances of runs of the Simulated Annealing algorithm. Assume the algorithm is trying to **maximize** the objective function.
    a. What can you say about the effect of temperature on the probability of choosing successor *b*?
    b. What is the *highest temperature* that would decrease the likelihood of choosing successor *b*? *Hint: you will need to consider additional temperatures.* The probability is computed as **exp((b-a)/c).**

Objective Function of Current State (a)	**Objective Function at Successor State (b)**	**Temperatures (c)**	**Probability of Selecting Successor**
17	15	50	0.96
17	15	10	0.81
17	15	5	0.67
17	15	1	0.13
17	15		
17	15		
17	15		