Help

L4 PROBLEM 2 (4/4 points)

For the questions below, please try to think about the solution in your head before using IDLE or a calculator to compute it. The goal of these questions is to give you some intuition about the topics we've been discussing.

1. Which of the following populations has the largest variance?

   - [0, 1, 2, 3, 4, 5, 6]
   - [3, 3, 3, 3, 3, 3, 3]
   - [0, 0, 0, 3, 6, 6, 6] ✔

   EXPLANATION:

   In all three sequences, the mean is 3, but the elements in C are, on average, farther away from the mean, so it has the largest variance.

2. Which of the following populations has the largest variance?

   - [3, 3, 5, 7, 7]
   - [1, 5, 5, 5, 9] ✔

   EXPLANATION:

   In both A and B, the sum of the absolute difference is 8 (A: 5-3 + 5-3 + 5-5 + 7-5 + 7-5 = 8; B: 5-1 + 5-5 + 5-5 + 5-5 + 9-5 = 8), but the variance is computed by taking the square of the difference - A: (5-3)^2 + (5-3)^2 + (5-5)^2 + (7-5)^2 + (7-5)^2 = 4 + 4 + 0 + 4 + 4 = 16; B: (1-5)^2 + (5-5)^2 + (5-5)^2 + (5-5)^2 + (9-5)^2 = 16 + 0 + 0 + 0 + 16 = 32.

   So they both have the same average absolute value deviation, but in B, the variance is higher.

3. If a number is removed from a population, the standard deviation of that population will always decrease.

   - True
   - False ✔

   EXPLANATION:

   Consider the population [1, 3, 5, 7, 9]. Removing 5 will increase the standard deviation.

4. You are taking samples of the ages of two populations, A and B. Population A is all the residents of San Francisco, while Population B is all the residents of Los Angeles.

The sample from Population A has a mean of 35 and a standard deviation of 1. The sample from Population B has a mean of 45 and a standard deviation of 15. Which of the following are certain?

- [ ] You will not find an individual in Population A that is over the age of 37.
- [ ] The average age of Population A is lower than the average age of Population B.
- [x] The average age of the sample of Population A is lower than the average age of the sample of Population B. ✔
- [ ] If the sample size of each population is 10, then you can conclude that your sample accurately represents the population.
- [x] A sample size of 1M is more appropriate than a sample size of 10 for these populations. ✔

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