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IE300
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Homework 8

For each problem, Python was utilized. The code can be seen attached.

1. The intervals were constructed by taking each sample and calculating the mean and standard deviation and using the equation:

   $$CI = [m - z*(std/sqrt(n)), m + z*(std/sqrt(n))]$$

   Where z = 1.714. n =23

   a. The solution for the samples can be seen below:
      i. Sample 1: 24.9807 to 24.9923 feet
      ii. Sample 2: 24.9792 to 24.9978 feet
      iii. Sample 3: 24.9805 to 24.9961 feet
      iv. Sample 4: 24.9741 to 24.987 feet
      v. Sample 5: 24.9722 to 24.9886 feet

2. The intervals were constructed using the outliers, which are boards shorter than 24.94 and longer than 25.04 feet, for each sample. The interval was calculated using the equation below:

   $$CI = [p - z*sqrt(p*(1-p)/n), p + z*sqrt(p*(1-p)/n)]$$

   Where p = number of outliers/n, n = 23, z = 1.714

   a. The solution for the samples can be seen below:
      i. Sample 1: 0.0101 to 0.2508
      ii. Sample 2: 0.1399 to 0.4688
      iii. Sample 3: 0.1039 to 0.4178
      iv. Sample 3: 0.1039 to 0.4178
      v. Sample 2: 0.1399 to 0.4688

3. The intervals were calculated using the variance from each sample

   $$CI3\_1 = [(n-1)*var/chi\_low, (n-1)*var/chi\_up]$$

   Where n = 23, chi_up = 12.34, chi_low = 33.92

   a. The solution for the samples can be seen below:
      i. Sample 1: 0.0101 to 0.2508 ft^2
      ii. Sample 2: 0.1399 to 0.4688 ft^2
      iii. Sample 3: 0.1039 to 0.4178 ft^2
      iv. Sample 3: 0.1039 to 0.4178 ft^2
      v. Sample 2: 0.1399 to 0.4688 ft^2

5. Mean = 24.985ft, Stdev = 0.021ft. All checks were done using simple if/then statements seen in the code
    a. I didn't understand this part
    b. 5/5
    c. 4/5
    d. 5/5