Quiz 5

Key

You are welcome to use a calculator for this quiz, but realize the incorrect answer with no supporting work will receive no partial credit.

1. A 95% confidence interval was calculated (using one-sample t-procedures) for the mean angle of deformity (of the big toe) among people who have HAV. The confidence interval is: $24.74 \pm 2.042\dfrac{6.34}{\sqrt{37}}$ or $(22.63, 26.89)$.

   Determine if the following are correct responses to the question, "What does it mean that we are 95% confident that the average angle of deformity among people who have HAV is between 22.63 and 26.98." If not correct, explain why.

   (a) [2] If I find a random person with HAV, the angle of deformity has a 95% chance of falling between 22.63 and 26.98.

   (+1) Not correct

   partial justified ✓ + .5 answer
   actual reason + .5

   This answer is assuming 24.74 is the population mean, and then using the definition of a density curve.

   ie

   24.74
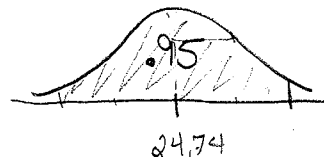
   A confidence interval is trying to find the population mean — not individual's data.

   (b) [2] We used a procedure that successfully catches the mean angle of deformity about 95% of the time.

   (+1) Correct.

   partial justified ✓ answer + .5 did well + .5

   The procedure by the way is: take an SRS and compute its associated interval

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1

2. For each of the following situations decide what is the appropriate significance test to use: one sample z- significance test, one-sample t-significance test, or two-sample t-significance test.

(a) [2] How quickly does polyester decay in landfills? A researcher buried 10 polyester strips in the soil for different lengths of time, then dug up the strips and measured the force required to break them. Breaking strength is easy to measure and is a good indicator of decay. Five of the strips, chosen at random, were dug up after 2 weeks; the other 5 were dug up after 16 weeks. The breaking strength for each strip was recorded. To test if the data gives good evidence that the mean breaking strength is less after 16 weeks than after 2 weeks, you would use what test? (Do not actually perform the test!)

ex 19.2
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partial wrong one
justified +.5
used t. & samp
+.5
2 samp +.5

(2) 2-sample t-test
μ_1 = mean breaking strength of polyester buried for 2 wks
μ_2 = " " 16 wks.
$H_0: \mu_1 = \mu_2$ $H_a: \mu_1 > \mu_2$

(b) [2] You are given the IQ test scores of 31 seventh-grade girls in a Midwest school district. IQ scores follow a Normal distribution with standard deviation $\sigma = 15$. Treat these 31 girls as an SRS of all seventh-grade girls in this district. IQ scores in a broad population are supposed to have mean $\mu = 100$. To test whether the mean in this district differs from 100, you would use what test? (Do not actually perform the test!)

15.37

partial wrong one
justified +.5
or +.5 used z
+.5 1 samp

(→2) 1-sample z-test
$H_0: \tilde{\mu}$ = ave IQ score in this district = 100
$H_a: \tilde{\mu} \neq 100$
$z\text{-stat} = \dfrac{\bar{X} - 100}{\left(\frac{15}{\sqrt{31}}\right)}$

(c) [2] The air in poultry-processing plants often contains fungus spores and more of them during the summer months. To measure the presence of spores, air samples are pumped to an agar plate and "colony forming units (CFUs)" are counted after an incubation period. You are given data from two locations in a plant that processes 37,000 turkeys per day, taken on four days in the summer. To test whether there is a difference in the mean amount of CFUs in the two different rooms, you would use what test? (Do not actually perform the test!)

#18.35

partial wrong one
justified +.5
or +1

+.5 used t +.5 1 samp
+.5 2 samp

(→2) 1-sample t-test
using a matched pair procedure

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