Quiz 3 Prep

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KEY will be out Monday

Stt 315 Sp 00

Quiz 3 is comprehensive for Project 6 (from Chapter 4) and Chapter 5 as covered in lecture and in this prep.

For prep on Project 6 see the KEY to Project 6.

This is prep for the Chapter 5 material.

1. We have sampled from a population in order to estimate (colloquial use of the term "estimate") the population mean \( \mu \). Our ___________ (rule for estimation) is the sample mean \( \bar{x} \). If we find from the data that the sample mean is equal to the number 8.6 this number is called the ____________.

   a) estimate, estimate
   b) estimate, estimator
   c) estimator, estimate
   d) estimator, estimator

2. When we claim that for a large sample size \( n \) (with repl, eq prob) the sampling distribution of the sample mean \( \bar{x} \) is approximately \( \text{N}(\mu, \sigma^2 / n) \) we are saying that one of these is approximately standard normally distributed. Which?

   a) \( \bar{x} \sqrt{n} / \sigma \)
   b) \( (\bar{x} - \mu) \sqrt{n} / \sigma \)
   c) \( \bar{x} n / (\sigma^2) \)
   d) \( (\bar{x} - \mu) n / (\sigma^2) \)
   e) none of them

3. Is \( \bar{x} \) UNBIASED for \( \mu \) (per above)?

   a) yes, as long as the samples have the same mean, but only if independent
   b) yes, as long as the samples have the same mean
4. Is \( \bar{x} \) CONSISTENT for \( \mu \) (per the above)?

a) yes, so long as the samples have the same distribution and are independent
b) yes, so long as the samples have the same mean

5. To use the normal approximation to determine \( P( \bar{x} < 4.13) \) for a sample of \( n = 60 \) from a population having \( \mu = 4 \) and \( \sigma = 2 \) one must first determine the standard score for 4.13. It is

a) 0.7120  
b) 1.1002  
c) 0.9251  
d) 0.2118  
e) 2.2993

6. From \( P( \bar{x} < 4.13) \sim P(Z < \text{standard score of 4.13}) \) evaluate this probability.

a) 0.7611  
b) 0.3307  
c) 0.6168  
d) 0.4467  
e) 0.7305

7. Refer to #5. The expectation of \( \bar{x} \) is

a) \( \frac{4}{60} \)  
b) 4  
c) \( \frac{4}{\sqrt{60}} \)  
d) 1/4  
e) none of the above

8. Refer to #5. The variance of \( \bar{x} \) is

a) 2
b) 4
c) 4/60
d) 2/60
e) 4/(\sqrt{60})

9. If I have the list of all sample averages, for all samples of n = 20 from a population having \( \mu = 3 \), the average of all these "averages of twenty" is

a) 3
b) 3/20
c) 9/20
d) 3/(\sqrt{20})
e) none of the above

10. In problem 2, if we substitute the (random variable) s (sample s.d.) for sigma WE ALSO GET A CORRECT STATEMENT. So which one is approximately normal?

a) \( \frac{\bar{x} (\sqrt{n})}{s} \)
b) \( \frac{(\bar{x} - \mu) (\sqrt{n})}{s} \)
c) \( \frac{\bar{x} n}{(s \text{ squared})} \)
d) \( \frac{(\bar{x} - \mu) n}{(s \text{ squared})} \)
e) none of the above

The substitution of s is very important beginning with Chapter 6.

11. Is s an UNBIASED estimator of sigma?

a) yes, if the sample is independent and identically distributed
b) yes, if the sample is large enough
c) no, but its bias decreases to zero with increasing n (it is "asymptotically unbiased")

12. 5-25 of your text
13. 5-26 of your text
14. 5-29 of your text

SKIP SECTION 5-5.