

Question 1:

Marks:5+2+3=10

(a) Suppose we have two independent random variables X and Y. Let X follows Normal distribution with mean 0 and variance 4; Y also follows Normal distribution with mean 1 and variance 9. A random sample of 10 observations is taken from each variable; then find $P(\bar{X} < \bar{Y})$.

Answer; -

$$Z = \frac{(\bar{X}_1 - \bar{Y}) - (\mu_1 - \mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

$$Z = \frac{(\bar{X} - \bar{Y}) + 1}{\sqrt{1.3}}$$

$$Z = \frac{(\bar{X} - \bar{Y}) + 1}{\sqrt{1.3}}$$

$$Z = (\bar{X} - \bar{Y}) 0.9$$

$$z 0.9 = \bar{X} - \bar{Y}$$

$$\bar{X} - \bar{Y} = z 0.9$$

$$\bar{X} - \bar{Y} = 0.3159$$

$$P(\bar{X} < \bar{Y}) = 0.3159$$

Use your mind this is just an idea

(b) What will be the value of population standard deviation if the size of the simple random sample is 25 and standard error of the mean is 2?

Answer; -

$$\begin{aligned} S^2 &= \frac{\sum (X - \bar{X})^2}{n - 1} \\ &= \frac{2}{25 - 1} \\ &= \frac{2}{24} \\ &= \frac{2}{24} \\ &= 0.08 \end{aligned}$$

Use your mind this is just an idea

(c) Why the Z test is usually inappropriate for small sample size? Give reasons in support of your answer.

Answer; -

A **Z-test** is any statistical test for which the distribution of the test statistic under the null hypothesis can be approximated by a normal distribution. Many test statistics are approximately normally distributed for large samples. Therefore, many statistical tests can be performed as approximate Z-tests if the sample size is large.

For best answer please use your search capabilities

For z table the sample should be greater then 30 if less then we use t-test coz

In less z table we can not find the vale of z in table ☺Ali☺ KAISA?

Question 2:

Marks:4+6=10

(a) When setting two sided $100(1 - \alpha) \%$, confidence interval for μ , based on a random sample of size n from a normal population, how the following changes will effect the length of the confidence interval for μ (assuming all other quantities remain fixed)

- increasing $\bar{X}$
- increasing $(1 - \alpha)$
- increasing s^2
- decreasing n

Answer; -

Change	Effect on confidence interval
increasing $\bar{X}$	Null
increasing $(1 - \alpha)$	wider
increasing s^2	wider
decreasing n	wider

(b) Suppose that the workers of factory B believe that the average income of the workers of factory A exceeds their average income. A random sample of workers is drawn from each of the two factories, and the two samples yield the following information:

Factory	Sample size	Mean	Variance
A	160	12.80	64
B	320	11.25	47

Test the above hypothesis? Also interpret your result.

Answer; -

**For 100% Correct idea please see page # 288 of
lecture 38 😊 pelase see once it is too easy.**

Question 3:

Marks:5+5=10

Not yet uploaded