

Formulae

Spring 2013

Statistics for Political Science: POLS 7000X

Professor: Khady Seck

Total time: 5.30 to 7.15 PM

Total points: 100. 5 questions, all carrying equal points

VERY IMPORTANT: SHOW ALL WORK FOR FULL CREDIT. ALL ROUGH WORKS SHOULD BE DONE IN BLUE BOOKS AND SUBMITTED ALONG WITH THE EXAM.

Q 1

Z follows normal with mean 0 and variance 1.

1 – Find the probability of Z between -1 and 2.

2 – Find $P(Z < -2.5)$

Q 2

The probability of an interval [a,b] is 80%. That is $P(a < Z < b) = 80\%$.

1 – Find the limits of the interval.

2 – Find the probability of the range of numbers below a and above b.

3 – If $P(a < Z < b) = 70\%$

What are the limits of the new interval?

4 – Find $P(Z < a)$ and $P(Z > b)$.

Q 3

$n = 10 ; \bar{x} = 124 ; s^2 = 21$

Find the 90% confidence interval for the mean.

Q4

1) A random sample of size 41 of a population random variable x results in a sample mean $\bar{x} = 75.82$ and a sample variance $s^2 = 16.16$. Find an approximate 99 percent confidence interval for the mean μ of x .

2) Let x be a random variable from a distribution with mean μ and variance $\sigma^2 = 9$. It is desired to obtain a confidence interval for μ with a margin of error of 1.5, based on a sample of size 16. What is the corresponding confidence level?

Q5

Consider a sample with $\bar{x} = 180.5$, $n = 12$, and the sample variance is $s^2 = 37.611$.

- 1) Test the null hypothesis at the 5% level whether the sample came from a population with mean 184, with an alternative that it came from a population with mean different from 184.
- 2) Test the null hypothesis at the 10% level whether the sample came from a population with mean 184, with an alternative that it came from a population with mean less than 184.

Total points: 100. 2 questions, all carrying equal points

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Q 1

Z follows normal with mean 0 and variance 1.
 1 - Find the probability of Z between -1 and 2.
 2 - Find $P(Z < -2.5)$

Q 2

The probability of an interval (a, b) is 80%. That is $P(a < Z < b) = 80\%$.
 1 - Find the limits of the interval.
 2 - Find the probability of the range of numbers below a and above b .

3 - If $P(a < Z < b) = 70\%$
 What are the limits of the new interval?
 4 - Find $P(Z < a)$ and $P(Z > b)$

Q 3

$n = 10$; $\bar{x} = 124$; $s^2 = 21$
 Find the 90% confidence interval for the mean.

Q 4

1) A random sample of size 41 of a population-random variable x results in a sample mean $\bar{x} = 75.82$ and sample variance $s^2 = 16.16$. Find an approximate 99 percent confidence interval for the mean μ of x .
 2) Let x be a random variable from a distribution with mean μ and variance $\sigma^2 = 9$. It is desired to obtain a confidence interval for μ with a margin of error of 1.5, based on a sample of size 16. What is the corresponding confidence level?

Q 5

Consider a sample with $\bar{x} = 180.5$, $n = 12$, and the sample variance is $s^2 = 37.611$.