Lab 6 Confidence Intervals and T-Tests

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Normal Distribution and CLT

• Central Limit Theorem:

- When is a sample "sufficiently large"?
- When do we assume normality?
- Inference: (1) Estimation vs. (2) Hypothesis Testing

Lecture 8: Confidence Intervals under known $\sigma^2(1)$

- Interpretation of a Confidence Interval
 - Math:
 - In words:
- Common Confidence Intervals for *μ*:

Confidence Level	α	Ζ	Confidence Interval	Picture Interpretation
100% CI				
99 % CI				
95% CI				
90% CI				

Samples from N(10,4)					
Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
8.879049	12.448164	7.864353	10.852928	8.610586	10.506637
9.539645	10.719628	9.564050	9.409857	9.584165	9.942906
13.117417	10.801543	7.947991	11.790251	7.469207	9.914259
10.141017	10.221365	8.542217	11.756267	14.337912	12.737205
10.258575	8.888318	8.749921	11.643162	12.415924	9.548458
13.430130	13.573826	6.626613	11.377280	7.753783	13.032941
10.921832	10.995701	11.675574	11.107835	9.194230	6.902494
7.469877	6.066766	10.306746	9.876177	9.066689	11.169227
8.626294	11.402712	7.723726	9.388075	11.559930	10.247708
9.108676	9.054417	12.507630	9.239058	9.833262	10.431883







Sample Means with 95% Confidence Intervals

Lecture 8: Confidence Intervals under known $\sigma^2(2)$

- Accuracy vs. Precision
 - Accuracy =
 - Precision =
 - What is the relationship between accuracy (precision ()?

and





What are the Assumptions to create these Confidence Intervals?

Interpret your Confidence Interval for 95%

Confidence Intervals when σ^2 unknown

- Why use a t-distribution?
- T-distribution vs. z-distribution

Confidence Intervals Summary

	σ^2 known	σ^2 unknown
Distribution		
Margin of Error (MOE)		
Confidence Interval (CI)		
Find sample size based on MOE (n= ?)		

Hypothesis Testing for μ

• Interpretation of the p-value:

• Hypothesis Testing Steps on Next Slide – practice these problems!

Step	σ^2 known	σ^2 unknown
(1) Hypothesis		
(2) Data		
(3) Statistical Test		
(4) Assumptions		

Step	σ^2 known	σ^2 unknown
(5) Decision Rule		
(6) Calculation		
(7) Statistical		
Decision		
(8) Practical Decision		

<u>Confidence Interval Method of Hypothesis Testing:</u>

Test Ho: $\mu_{\text{private}} = \mu_{\text{university}}$ versus Ha: not so, at α =0.05

How would we do this? *Hint: what would have to change in the graph below?*

