Hypothesis Testing

Single Sample

Population Standard Deviation Known

State Average (μ) on Benchmark Exam: **193.8**

Standard Deviation (σ): **31.55**

50 students (n) in your school scored an average of 202.94 (X).

Did your school score significantly better than the state average?

Null: There is no difference between the state average and your school.

Population Standard Deviation is KNOWN

Therefore, compute Z

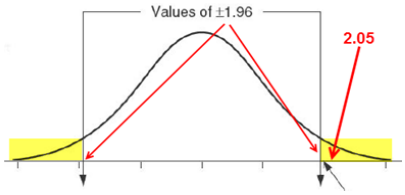
$$Z = \frac{\overline{X} - \mu}{\sigma_{\bar{x}}} \qquad \sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Square Root of n (50) = 7.07
Standard Error ($\sigma_{\bar{x}}$) = 31.55/7.07 = 4.46

$$Z = \frac{202.94 - 193.80}{4.46}$$

Z = 2.05

Using the 95% confidence level the critical region begins at 1.96



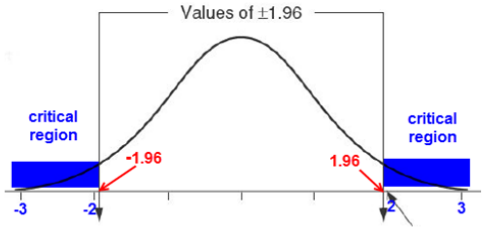
Since 2.05 > 1.96 it is in the critical region, therefore we reject the null hypothesis that there is no difference and conclude that there is a significant difference between your students' and the state average scores.

The value at which the critical region begins is the ***CRITICAL VALUE***.

In this case, the critical value for a 95% confidence level is +/- 1.96.

The calculated result is known as the ***CALCULATED TEST STATISTIC***

If the ***calculated test statistic is greater than the critical value*** we reject the null hypothesis.



Instructor created spreadsheet program

TZ SINGLE SAMPLE CALCULATOR

	A	B	C
1			
2	**POPULATION STANDARD DEVIATION is Known**		
3	Population mean	193.8	
4	Population standard deviation	31.55	
5	Sample mean	202.94	
6	Sample size (n=)	50	
7	**Z = (x - μ) / (σ / sqrt(n)) =**	**2.05**	
8			
9			
10			