**Homework 3 Part 2**

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***Problem 1***

*Question 1*

**Null Hypothesis**: Mean Engagement of the Students who become knowledgeable in the course is 0.75

**Alternate Hypothesis**: Mean Engagement of the Students who become knowledgeable in the course is not 0.75

The type of test that can be used is the **z-test** as we have more than 30 datapoints in our sample based on the rule of thumb

*Question 2*

* Standard Deviation of Sample is 0.12712605795317614
* The Sample size is 937
* The Sample mean is 0.743
* Standard Error of Sample is 0.00415
* The Sample mean is 0.743
* z-score of Sample is -1.68
* p-value of Sample is 0.0933
* The result is significant at an alpha value of 0.1. Therefore we can reject the Null Hypothesis and the average is not 0.75

*Question 3*

* z-score of sample where 0.05 is significant is -1.96
* Standard Deviation of sample is 0.127
* Standard Error of sample is 0.00356
* Minimum number of data points in the sample needed to be significant at 0.05 is 1279

*Question 4*

The **Null Hypothesis** is the mean in engagement between the students who become knowledgeable and the students who do not will be different

The **Alternate Hypothesis** is the mean in engagement between the students who become knowledgeable and the students who do not will not be different

The type of test that can be used is the **z-test** as we have more than 30 datapoints in our sample based on the rule of thumb

*Question 5*

* The sample size of eng0 is 1977 and the sample size of eng1 is 937
* The mean is -0.103
* The standard deviation is 0.00707
* The z-score is -121
* p-value is 0.0
* The Null hypothesis can be rejected

***Problem 2***

*Question 1*

* For this sample of data a t-test is required as it has less than 30 datapoints
* Sample Mean is 7.36
* Standard Deviation is 16.8
* Standard Error is 5.08
* 95% Confidence interval: (-3.95 , 18.7)

*Question 2*

* 90% Confidence interval: (-1.84, 16.6)
* The t-score and interval decreased because the confidence decreased by 5%

*Question 3*

* A standard distribution is used because the population standard deviation is given
* Standard Error is 5.08
* Confidence interval: (-2.59, 17.3)

*Question 4*

* Confidence Level is 0.822
* Confidence Interval is (0, 14.73)
* The confidence level is 0.82 so we are 82 percent confident that the team will win over average