1) A group of 40 students take an IQ test after taking Professor Wrobel’s course and are found to score an average of 119. Test the hypothesis that these students are smarter than the average population to a statistically significant extent. The population average IQ is 100 with a standard deviation of 15. Construct your test so that you’re 99% confident in your conclusion.

H0: There is no difference between the sample mean and population mean. Mean = 100

HA: The sample mean > the population mean. Mean > 100

One or two samples: One

One or two tales: One

If one tailed, left or right: Right

Means or proportions: Means

Alpha: 1%

Z or T Value: Z

Degrees of freedom, if relevant: NA

Critical value: 2.33

Reject or fail to reject null: Reject the null

2) A group of 10 students take an IQ test after taking Professor Smith’s course and are found to score an average of 93. Test the hypothesis that these students are less intelligent than the average population to a statistically significant extent. The population average IQ is 100 with a standard deviation of 15. Be 95% confident in your conclusion.

H0:

HA:

One or two samples:

One or two tales:

If one tailed, left or right:

Means or proportions:

Alpha:

Z or T:

Z or T Value:

Degrees of freedom, if relevant:

Critical value:

Reject or fail to reject null:

3) A group of 30 students take an IQ test after taking Professor Jones’s course and are found to score an average of 103. Test the hypothesis that these students have a **different level of intelligence** than the average population to a statistically significant extent. The population average IQ is 100 with a standard deviation of 15. Be 95% confident in your conclusion.

H0: There is no difference between the population mean and the sample mean. Mean = 100

HA: There is a difference… Mean =/= 100

One or two samples: One

One or two tales: Two

If one tailed, left or right: NA

Means or proportions: Means

Alpha: 5%

Z or T: Z

Z or T Value:

Degrees of freedom, if relevant:

Critical value:

Reject or fail to reject null:

4) In the past, students have taken an average of 95 minutes to complete the midterm exam, with a standard deviation of 10 minutes. The most recent class of 15 students completed the exam in 78 minutes. Test the hypothesis that the average test time for the most recent class was less than past exam takers to a statistically significant extent. Be 90% sure of your results.

H0:

HA:

One or two samples:

One or two tales:

If one tailed, left or right:

Means or proportions:

Alpha:

Z or T:

Z or T Value:

Degrees of freedom, if relevant:

Critical value:

Reject or fail to reject null:

5) A coin is flipped 100 times and lands on heads 71 times. Test the hypothesis that the proportion of times the coin landed on heads is greater than what would be expected of a fair coin to a statistically significant extent. Be 95% sure of your results.

H0: There is no difference between this coin and a hypothetical fair coin. Proportion=50%

HA: There is a difference, the coin lands on heads more than a fair coin would. P = >50%

One or two samples: One

One or two tales: One

If one tailed, left or right: Right

Means or proportions: Proportion

Alpha: 5%

Z or T: Z

Z or T Value: 4.2

Degrees of freedom, if relevant: NA

Critical value: 1.65

Reject or fail to reject null: Reject the null

6) The 35 students in the Wednesday class scored an average of 94% on the exam, with a standard deviation of 6, while the 30 students in the Tuesday class scored an average of 89%, with a standard deviation of 9. Test the hypothesis that the Wednesday class scored higher than the Tuesday class to a statistically significant extent. Be 99% sure of your results.

H0:

HA:

One or two samples:

One or two tales:

If one tailed, left or right:

Means or proportions:

Alpha:

Z or T:

Z or T Value:

Degrees of freedom, if relevant:

Critical value:

Reject or fail to reject null:

7) The percentage of students who fail the online section of the course is 15%, while the percentage that fail the in-person section 9%. There were 93 students in the online section and 125 in the in-person section. Test the hypothesis that there is a statistically significant difference between the proportion of students who fail in each section. Be 90% confident in your results.

H0:

HA:

One or two samples:

One or two tales:

If one tailed, left or right:

Means or proportions:

Alpha:

Z or T:

Z or T Value:

Degrees of freedom, if relevant:

Critical value:

Reject or fail to reject null: