

1. A research firm surveyed a sample of 300 individuals from a community and found out that 50 of them disagreed with a new construction project.

a) Use this sample to find the 95% confidence interval estimate for the percentage of people in this community that would disagree with a new construction project in this community.

Report the result using point estimate and margin of error.

$$16.67\% \pm 4.22\%$$

b) At 5% level of significance, test to see the percentage of people who disagreed is less than 20%.

$$\hat{p} = .1667, z = -1.44, p\text{-value} = 1 - .9251 = .0749 > 0.05, \text{failed to reject } H_0.$$

2. In a study of maximal aerobic capacity, a random sample of women were selected for this study, and one measurement of blood plasma volume was made from each woman and they are listed below:

3.5 3.8 2.9 3.8 2.7 3.6 3.4 3.7

a) Find the mean and the standard deviation of this sample.

Sample mean = 3.425

Sample standard deviation = 0.413

b) Assume that these are observations from a normal distribution. Find a 95% confidence interval estimates for the **mean** blood plasma volume of the population.

95 percent confidence interval for mean: (3.079576 3.770424)

c) If one wishes to produce a 95% confidence interval estimate for the mean of the population with a margin of error of 0.02, how large a sample would be needed, if the population standard deviation is 0.5?

2401

3. A group of researchers was trying to evaluate the influence of exercise on human's pulse rate. Two measurements were made to understand the effect of exercise to pulse rates, one at the beginning of the study (Baseline) and one at the end of 2 months of routine exercise.

Subject ID:	1	2	3	4	5
Baseline:	72	76	70	69	74
After Exercise:	68	73	66	65	70

Find the 95% confidence interval estimate for the average reduction in pulse rate. The differences in pulse rates before and after exercise are assumed normally distributed. And, at 5% level of significance, test to see if the difference in pulse rates before and after exercise is statistically significant.

95 percent confidence interval: (3.244711 4.355289); p-value = 0.000045