Directions

Scan and upload your *handwritten* solutions to eLearning by the end of the day on **Monday, April 3**. Show sufficient work or credit may not be given.

Part 1: Show all work 'by hand'. No STAT functions are permitted.

Problem 1 (3 points @ 1.5 points each)

In a previous class survey, 112 out of 190 students said they do not currently have a job.

(a) Assuming these results are from a random sample, construct a 95% confidence interval to estimate the proportion of students that do not currently have a job. Write a sentence to summarize your findings.

(b) What sample size is needed to construct a 99% confidence interval for the proportion of students that do not currently have a job if we want our estimate to be within 4% of the true proportion and we know from a previous survey that this proportion was estimated to be 62%?

Problem 2 (5 points @ 2.5 points each)

Let $X_1, X_2, \ldots, X_n$ have the pdf

$$f(x|\theta) = \theta x^{\theta-1}$$

for $0 < x \leq 1$ and $\theta > 0$.

(a) Derive the method of moments estimator (MOME) for θ.
(b) Derive the maximum likelihood estimator (MLE) for θ.
*Note: Your answers may or may not be the same.

Part 2: STAT functions are permitted. No work is necessary.

Problem 3 (2 points)

In a previous class survey, 51 of 140 males play a musical instrument and 19 out of 49 females also play a musical instrument. Construct a 97% confidence interval for the difference of proportions of male and female students who play a musical instrument. Using the confidence interval, determine if there evidence that one sex is more musically inclined than the other. Explain.