Homework 4 - Math 121 **Name:** _____

Due by 5:00pm Friday, October 9. Send a PDF with your solutions to `blins@hsc.edu`.

1. The 2018 General Social Survey asked 1,578 US residents: "Do you think the use of marijuana should be made legal, or not?" 61% of the respondents said it should be made legal.

   (a) Is 61% a sample statistic or a population parameter?

   (b) Calculate a 95% confidence interval for the proportion of US residents who think marijuana should be made legal.

   (c) A critic points out that this 95% confidence interval is only accurate if the statistic follows a normal distribution, or if the normal model is a good approximation. Is this true for these data? Why or why not?

   (d) A news piece on this survey's findings states, "Majority of Americans think marijuana should be legalized." Based on your confidence interval, is this statement justified?

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2. Write the null and alternative hypotheses in symbols for each of the following situations. Be sure to give each variable a short descriptive subscript so that it is easy to understand what it represents.

   (a) A tutoring company would like to know if more than half of its students improve their grades after they use their services. They sample 200 of the students who used their service in the past year and ask them whether their grades have improved from the previous year.

   (b) A study suggests that 60% of college student spend 10 or more hours per week communicating with others online. You believe that this is incorrect and decide to collect your own sample for a hypothesis test. You randomly sample 160 students from your dorm and find that 70% spent 10 or more hours a week communicating with others online.

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3. A 2018 survey of 743 teens in the USA found that 59% had expercienced some kind of online cyberbullying. Use this information to carry out hypothesis test to determine if this is statistically significant evidence that more than half of all teens have experienced cyberbullying. Be sure to state the hypotheses, find the z-value, find the p-value, and explain what it all means.

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4. Using the same data as the previous problem, make a 90% confidence interval for the proportion of all teens who have experienced cyberbullying.

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5. A 2011 Pew Reseach poll interviewed 331 American adults who did not have a four-year college degree and were not currently enrolled in school. Of those 48% said they decided not to go to college because they could not afford school.

   (a) What is the population of interest in this poll?

   (b) What was the margin of error (at the 95% confidence level) for this poll?