1. The Hopkins Symptom Checklist (HSC) is a questionnaire that assesses the presence or absence of many psychological symptoms; higher scores indicate poorer mental health. The HSC questionnaire was administered to all 100 students in an Introductory Psychology course: for this sample, the mean score ($\bar{X}$) was 50 and the standard deviation ($s$) was 15. Also, the distribution of scores was (approximately) normal. Based on this information:

(a) What score (in this sample) corresponds to a $z$-score of -1?

Answer: ____________________________

(b) What is the range of scores that you would expect to contain the middle 50% of scores in the sample?

Answer: ____________________________

(c) What score would you expect to cutoff the upper 10% of scores in the sample?

Answer: ____________________________

(d) What are your best guesses for the values of the mean ($\mu$) and standard deviation ($\sigma$) of the distribution of scores in the population (i.e., all Introductory Psychology students in all universities)?

Answer: ____________________________

(e) What are your best guesses for the values of the mean ($\mu_{\bar{X}}$) and standard deviation ($\sigma_{\bar{X}}$) of the sampling distribution of means for samples with 100 observations ($N = 100$)?

Answer: ____________________________

2. For this question, assume that the HSC has been administered to a very large number of first-year university students and that the resulting scores have a mean of 45 and and standard deviation of 15. The instructor for the Introductory Psychology course mentioned in question 1 wants to know if the students in her class have poorer mental health, on average, than first-year students in general. Using the HSC as a measure of mental health, state the null (H0) and research/alternative hypotheses (H1) that address the instructor’s question and could be evaluated with a z test.

H0: ____________________________

H1: ____________________________

3. As part of the analysis of the HSC data, the Psychology instructor transforms the questionnaire scores into $z$ scores. What are the mean and standard deviation of the transformed scores?

Answer: ____________________________
4. When a scientist reports that “the results of our statistical test allow us to reject the null hypothesis ($t(19) = 2.3, p = 0.016$)...”, what does the $p$ value mean? Write your answer in the box below.

5. Both $z$ and $t$ tests can be used to evaluate hypotheses about a single group mean. When should we choose to use a $t$ test instead of a $z$ test? Why? Write your answer in the box below.

6. What is the difference between a one-tailed and two-tailed $t$ test? List one possible advantage and one possible disadvantage of using a one-tailed test instead of a two-tailed test. Write your answer in the box below.