1. A recent news article reported that, in a sample of 200 cities, there was an average of 17 pregnancy-related deaths among women who are under 20. The sample standard deviation was 3. We wish to calculate a 90% confidence interval for the true mean number of pregnancy-related deaths.

    a. Find the 90% confidence interval for this problem. Label a diagram with all needed numbers.
        The confidence interval is: _____

    b. What distribution did you use to construct the confidence interval. Explain why you used this distribution.

    c. What would happen to the 90% confidence interval if we increase the sample size to 500 cities but the sample mean and standard deviation stay the same? Explain why this happens.

2. A recent article in the San Jose Mercury News reported that, in a survey of 800 Silicon Valley children ages 10 to 17, 15% go online less than once a month. We wish to construct a 95% confidence interval for the true proportion of Silicon Valley children ages 10 to 17 who go online less than once a month.
    a. P'=
    b. P'~
    c. Draw and label a diagram
    d. Find the desired confidence interval.
    e. Interpret your interval

3. Suppose the null hypothesis is "The brakes work". You are in a car at the top of a steep, winding road with a cliff to one side. Which has the worse consequence: a Type I error or a Type II error. Explain your answer.

4. An article in *La Voz* in May 2001 stated that approximately 62% of De Anza students were expected to NOT vote in the DASB elections that year. Suppose that you believe that this year, the percent is actually higher than the 62% reported. You conduct a survey. Of the 212 students you survey, 141 did not vote.
    a. Conduct a hypothesis test at a 5% significance level

    b. **Multiple Choice:** The Type I error for this problem is:
        A. We claim the proportion is 0.62 when, in fact, it is higher that 0.62.
        B. We claim the proportion is 0.62 when, in fact, it is not 0.62.
        C. We claim the proportion is higher than 0.62 when, in fact, it is 0.62.
        D. We claim the proportion is not 0.62 when, in fact, it is not 0.62.

5. A recent article in the San Jose Mercury News reported that dieters who follow the Atkins diet lost an average of 13 pounds. Suppose a consumer watchdog agency feels that the average is lower than that reported. They conduct a study of 25 dieters and find that these 25 dieters lost an average of 11.5 pounds with a sample standard deviation of 3 pounds. Conduct a hypothesis test at a 1% significance level.

6. An insect repellant manufacturing company wants to determine if adding a new chemical to the formula decreases the number of insect bites. 43 volunteers have one arm treated with the old formula and the other arm treated with the new formula. After exposing their arms to mosquitoes, the number of bites on each arm is recorded. For each person, the difference in the number of bites (new formula – old formula) is computed as x_d.

The statistics are: $\qquad \bar{x}_d = -3.5 \qquad s_d = 4.1 \qquad n = 43$

   a. **Multiple Choice**: What type of hypothesis test is this?
      A. Test of two proportions
      B. Test of a single mean
      C. Paired samples
      D. Test of two independent groups: means

   b. Conduct a hypothesis test to see if adding the new chemical decreases the number of insect bites. Use a significance level of 1%.

7. A product design firm in Silicon Valley wants to determine if the average number of user errors in a product built using new standards is less than the same product built to older standards. Two samples are taken with the results summarized below: Conduct a hypothesis test using a 5% significance level.

	New Standards	Old Standards
Sample Size	76	58
Sample Mean	13,224	23,509
Sample St. Dev.	5920	8294

8. A researcher conducts a study to investigate whether the proportion of college students who drink alcohol decreased between 1991 and 2001. In a national study conducted in 1991, 3820 students out of a sample of 4845 college students said that they drank alcohol. In 2001, a similar study reported that 4105 college students said they drank alcohol out of 5265 students asked. Conduct a hypothesis test using a 5% significance level.

9. Determine whether the following are examples of an observational study or a designed experiment.

   a. A survey is conducted asking 400 people: "Do you prefer Coke or Pepsi?"
   b. While shopping, 200 people were asked to perform a taste test in which they drank from two randomly placed, unmarked cups. They are then asked which drink they preferred.

Selected Answers:

   1. a (16.65, 17.35)   b. t_{199} c. the error bound would decrease

   2. b. $P' \sim N\left(0.15, \sqrt{\frac{0.15*0.85}{800}}\right)$ d. (0.1253, 0.1747)

   3. the Type II error is worse.

   4. a. p-val = .0881   Do not reject H_0 The percent who did not vote is about 62%
      b. C
   5. Reject H_0 The average amount of weight lost is less than 13 pounds.
   6. a. C   b. t = -5.60   p-val = 0   Reject H_0 the new formula decreases the number of bites
   7. t = -8.01   p-val = 0   Reject H_0 the errors are less with the new standards
   8. z = 1.0696   p-val = .1424   Do not reject H_0 the percent has not decreased
   9. a. observational study   b. designed experiment