1. Observational studies suggest that moderate use of alcohol by adults reduces heart attacks and that red wine may have special benefits. One reason may be that red wine contains polyphenols, substances that do good things to cholesterol in the blood and so may reduce the risk of heart attacks. In an experiment, healthy men were assigned at random to drink half a bottle of either red or white wine each day for two weeks. A graph of the data shows now strong skewness or outliers. The level of polyphenols in their blood was measured before and after the two-week period. Here are the percent changes in level for the subjects in both groups:

Red	3.5	8.1	4.0	0.7	4.9	8.4	7.0	5.5	7.4
White	3.1	0.5	-3.8	4.1	-0.6	2.7	1.9	-5.9	0.1

   a. Construct and interpret a 90% confidence interval for the difference in mean percent change in polyphenol levels for the red wine and white wine treatments.

   b. Does the interval in part (a) suggest that red wine is more effective than white wine? Explain

2. Different varieties of the tropical flower Heliconia are fertilized by different species of hummingbirds. Researchers believe that over time, the lengths of the flowers and the forms of the hummingbirds' beaks have evolved to match each other. Here are data on the lengths in millimeters for random samples of two color varieties of the same species of flower on the island of Dominica:

Red Heliconia							
41.90	42.01	41.93	43.09	41.17	41.69	39.78	40.57
39.63	42.18	40.66	37.87	39.16	37.40	38.20	38.07
38.10	37.97	38.79	38.23	38.87	37.78	38.01	

Yellow Heliconia							
36.78	37.02	36.52	36.11	36.03	35.45	38.13	37.10
35.17	36.82	36.66	35.68	36.03	34.57	34.63	

a. Create 2 graphs (you can do this on your calculator and then draw a rough sketch) and write a few sentences comparing the distributions.

b. Construct and interpret a 95% confidence interval for the difference in the mean lengths of these two varieties of flowers.

c. Does the interval in part (b) support the researchers' belief that the two flower varieties have different average lengths. Explain?

3. College financial aid offices expect students to use summer earnings to help pay for college. But how large are these earnings? One large university studied this question by asking a random sample of 1296 students who had summer jobs how much they earned. The financial aid office separated the responses into two groups based on gender. Here are the data in summary form:

Group	n	$\bar{x}$	s_x
Males	675	$1884.52	$1386.37
Females	621	$1360.39	$1037.46

a. How can you tell from the summary statistics that the distribution of earnings in each group is strongly skewed to the right? The use of two-sample t procedures is still justified? Why?

b. Construct and interpret a 90% confidence interval for the difference between the mean summer earnings of male and female students at this university.

c. Interpret the 90% confidence level in the context of this study.

4. The National Assessment of Educational Progress (NAEP) Young Adult Literacy Assessment Survey interviewed a random sample of 1917 people 21 to 25 years old. The sample contained 840 men and 1077 women. The mean and standard deviation of scores on the NAEP's test of quantitative skills were $\bar{x}_1 = 272.40$ and $s_{x1} = 59.2$ for the men in the sample. For the women, the results were $\bar{x}_2 = 274.73$ and $s_{x2} = 57.5$.

    a. Construct and interpret a 90% confidence interval for the difference in mean score for male and female young adults.

    b. Based only on the interval from part (a), is there convincing evidence of a difference in mean score for male and female young adults?