Show all work neatly and systematically for full credit. Total points:100.
Note: for hypothesis testing and confidence interval, make sure to show all steps. Make sure to write conclusion sentences.

Provide an appropriate response.

1) (10) At a local store, 65 female employees were randomly selected and it was found that their mean monthly income was $625 with a standard deviation of $121.50. Seventy–five male employees were also randomly selected and their mean monthly income was found to be $667 with a standard deviation of $168.70. Test the hypothesis that male employees have a higher monthly income than female employees. Use $\alpha = 0.01$.

2) (10) In a random sample of 300 women, 49% favored stricter gun control legislation. In a random sample of 200 men, 28% favored stricter gun control legislation. Construct a 98% confidence interval for the difference between the population proportions $p_1 - p_2$. Can you conclude that proportion of woemen favored stricter gun control legislation is higher than that for men?

3) (10) A researcher was interested in comparing the amount of time spent watching television by women and by men. Independent simple random samples of 14 women and 17 men were selected, and each person was asked how many hours he or she had watched television during the previous week. The summary statistics are as follows.

Women	Men
$\bar{x}_1 = 12.5$ hrs	$\bar{x}_2 = 14.3$ hrs
$s_1 = 3.9$ hrs	$s_2 = 5.2$ hrs
$n_1 = 24$	$n_2 = 27$

Construct a 99% confidence interval for $\mu_1 - \mu_2$. Can you conclude that the mean amount of time spent watching television for women is less than the mean amount of time spent watching television for men.?

4) (10) In a random sample of 500 people aged 20–24, 110 were smokers. In a random sample of 450 people aged 25–29, 65 were smokers. Test the claim that the proportion of smokers age 20 –24 is higher than the proportion of smokers age 25 –29. Use a significance level of 0.01.

5) (16 points) A coach uses a new technique in training middle distance runners. The times for 8 different athletes to run 800 meters before and after this training are shown below. Assume samples have been randomly selected from normally distributed populations.

Athlete	A	B	C	D	E	F	G	H
Time before training (seconds)	118.7	111.1	115.1	109.4	117.9	111.3	116.2	109
Time after training (seconds)	119.3	109.8	112.7	110.2	116.1	111.4	112.6	105.1

a. (10) Using a 0.05 level of significance, test the claim that the training helps to improve the athletes' times for the 800 meters.

b. (6) Construct a 90% confidence interval for the mean difference of the "before" minus "after" times.

6) (16 points) The data below are the average one–way commute times (in minutes) of selected students during a summer literature class and the number of absences for those students for the term.

Commute time (min), x	70	83	89	88	86	96	73	98	78
Number of absences, y	7	11	14	14	12	19	8	19	9

a. (3) Draw a scatterplot.

b. (2) Find the linear correlation coefficient.

c. (3) Test whether there is a linear correlation between the average one–way commute times (in minutes) and the number of absences.

d. (2) Find the regression equation.

e. (2) Interpret the slope and the y–intercept, if possible.

f. (2) Predict the number of absences for the summer literature class for a student who has one–way commute time of 80 minutes.

g. (2) How many percent of variation in the number of absences can be explained by the linear relation between the one–way commute time and the number of absences? (The coefficient of determination.)

7) (11) A teacher figures that final grades in the chemistry department are distributed as: A, 25%; B, 25%; C, 40%; D, 5%; F, 5%. At the end of a randomly selected semester, the following number of grades were recorded. Test the claim that the grade distribution for the department is different than expected. Use $\alpha = 0.01$.

Grade	A	B	C	D	F
Number	36	42	60	8	14

(6) Use the given data to find the best predicted value of the response variable.

8) Based on the data from six students, the regression equation relating number of hours of preparation (x) and test score (y) is $\hat{y} = 67.3 + 1.07x$. The same data yield r = 0.224 and $\bar{y} = 75.2$. What is the best predicted test score for a student who spent 4 hours preparing for the test? (Note that you need to check wither there is a linear correlation between the variables first)

9) (11) A medical researcher is interested in determining if there is a relationship between adults over 50 who exercise regularly and low, moderate, and high blood pressure. A random sample of 236 adults over 50 is selected and the results are given below. Test the claim that exercise and the blood pressure are independent. Use $\alpha = 0.01$.

Blood Pressure	Low	Moderate	High
Reg. Exercise	35	62	25
No Reg. Exercise	21	65	28