1. The mean time to locate flight information on Internet web sites of the major airline companies is generally 2 to 3 minutes (USA Today, September 11, 2000). Sample results representative of the times for Delta Airlines and Northwest Airlines are as follows:

Delta	Northwest
$\bar{x}_1 = 2.5$ minutes	$\bar{x}_2 = 2.1$ minutes
$s_1 = 0.8$ minutes	$s_2 = 1.1$ minutes
$n_1 = 22$	$n_2 = 20$

   a. Formulate the hypotheses if the purpose is to test for a significant difference between the mean times for the two airlines.
   b. Compute the value of the test statistic.
   c. What is your conclusion by the P value method at 5% level of significance?
   d. Conduct the same test with the critical value method.

2. Data on advertising expenditures ($1000s) and revenue ($1000s) for the Four Seasons Restaurant follow.

Advertising Expenditures	Revenue
1	19
2	32
4	44
6	40
10	52
14	53
20	54

   a. Find the least-squares regression line and interpret your estimates.
   b. Calculate the standard error of estimate of the regression line.
   c. Do the data represent sufficient evidence to indicate that X and Y are linearly related?
   d. Determine the sample correlation coefficient. What does this tell us?
   e. How much of the variance in the revenue is explained by knowing the total advertising expenditures at the Four Seasons restaurant?
   f. How much of the variance in the revenue is not explained by knowing the total advertising expenditure at the Four Seasons restaurant?

3. A. The executive vice-president of a large corporation has been studying the annual salaries of the corporation's salespeople. A regression equation is estimated having the following variables:

Y = annual salary of employee (in thousands of dollars)
X_1 = employee's number of years of education
X_2 = employee's number of years of seniority
X_3 = value of equipment sold by employee (in thousands of dollars)

The estimated equation is:

$$y = 16 + 0.5x_1 + 1.2x_2 + 0.06x_3$$

Suppose a sales person has 18 years of education and 7 years of seniority, and sold $150,000 worth of equipment. Predict this person's salary.

B. Thompson photo purchased several new, highly sophisticated processing machines. The production department needed some guidance with respect to qualifications needed by an operator. Is age a factor? Is the length of service as an operator important? In order to explore further the factors needed to estimate performance on the new processing machines, four vehicles were listed:

X_1=Length of time an employee was in the industry.

X_2=Mechanical aptitude test score.

X_3=Prior on the job rating.

X_4=Age.

Performance on the new machine is designated Y.

Thirty employees were selected at random. Data were collected for each, and their performances on the new machines were recorded.

Based on the data, the estimated multiple regression equation is given by:

$$Y' = 11.6 + 0.4X_1 + 0.286X_2 + 0.112X_3 + 0.002X_4$$

Carl Knox applied for a job at photo works. He has been in the business for six years, and scored 280 on the mechanical aptitude test. Carl's prior on the job performance rating is 97, and he is 35 years old. Estimate Carl's performance on the new machine.

4. It is theorized that the rate of return on common equity depends on the growth rate of common equity and earnings per share. To investigate this notion, ten firms are randomly selected from the chemical industry, and the following information is collected about these firms.

Firm	*Return on Common Equity*	*10-YearGrowth*	
		Common Equity	*Earnings per Share*
	Y	X_1	X_2
A	12.2	8	14
B	10.9	8	10
C	14.9	13	10
D	19.8	9	22
E	15.7	12	16
F	19.9	16	24
G	12.5	11	8
H	7.3	8	5
I	10.2	6	10
J	7.6	6	9

A multiple linear regression was carried out, and the computer output yielded the following data.

Column	***Coefficient***	***Standard Deviation of Coefficient***	***T-Ratio = Coeff./Standard Deviation***
Intercept	1.7886	1.7179	1.04
X1 C2	0.4899	0.1971	2.49
X2 C3	0.5124	0.1031	4.97

The Standard Deviation of Y about Regression Line is S = 1.614
With (10 – 3) = 7 Degrees of Freedom
R-Squared = 89.8 percent
Analysis of Variance

Due to	DF	SS	MS = SSDF	
Regression	2	161.214	80.607	F Ratio = 30.95
Residual	7	18.226	2.604	

a. What is the effect of growth in earnings per share on the rate of return on common equity?

b. What is the effect of growth in common equity on the rate of return?

c. Use a 0.05 level of significance to test the hypothesis that the growth rate of earnings per share has no effect on rate of return on common equity.

d. At a 0.05 level of significance, is the regression significant as a whole?

e. Predict the rate of return of a firm with a ten-year growth rate of 8 in common equity and 10 in earnings per share.