

**Math 10**  
**Spring 99**  
**Practice Exam I**

**Disclaimer:** This set of problems is meant neither to indicate the length nor composition of the actual exam. Many are taken from earlier exams or practice exams. However, they may give an indication of the type of problems which will appear on the exam.

For problems 1-8, circle the letter of the correct response

1. The histogram displays sales in millions of dollars of 97 large US companies. This distribution is
  - (a) approximately symmetric
  - (b) skewed
  - (c) nearly symmetric with a few outliers
  - (d) none of the above
2. The histogram above makes it clear that the mean sales
  - (a) is larger than the median sales
  - (b) is smaller than the median sales
  - (c) is about equal to the median sales
  - (d) can be either larger or smaller than the mean sales—there is not enough information in the histogram to decide
  - (e) is approximately 5,000,000,000 dollars.
3. The histogram above shows that the number of companies with sales between \$7,500M and \$10,000M
  - (a) is about 30
  - (b) is about 20
  - (c) is about 10
  - (d) can only be estimated by examining the actual data
  - (e) is the majority of the companies

4. In writing an article about the the sales of large companies you decide to report the median as the typical salary. To describe the variation or spread in salaries, it is most appropriate also to report
- (a) The standard deviation
  - (b) The correlation squared
  - (c) The variance
  - (d) The number of companies examined
  - (e) The interquartile range
5. In the histogram above
- (a) there are no outliers
  - (b) there are outliers shown on the histogram both above and below the median value
  - (c) there are outliers shown on the histogram below the median value
  - (d) there are outliers shown on the histogram above the median value
  - (e) none of the above
6. A study reports a correlation of  $r = -0.64$  between family income in dollars and the number of pounds of soft margarine the family consumes in a year. You conclude that
- (a) This is nonsense—you can't compute a correlation between income and amount of margarine.
  - (b) something is wrong—a correlation can't take the value -0.64.
  - (c) higher income families consume less soft margarine than do lower income families
  - (d) Higher income families consume more soft margarine than do lower income families
  - (e) about 80% of the variation in number of pounds of soft margarine consumed is explained by a linear relationship between family income and number of pounds of soft margarine.
7. A teaching assistant is recording grades on a 10 question quiz. Each question is graded either correct or incorrect. The TA writes down a list of the number of questions each student got correct and a list of the number of questions each student got wrong. The average number of correct answers is 6.4 with a standard deviation of 2.0; the average number of incorrect answers is 3.6 with standard deviation 2.0. The correlation coefficient between these two lists is
- (a) 0
  - (b) -0.5
  - (c) 0.5
  - (d) 1
  - (e) -1

8. For about 700 Statistics 2 students at UC Berkeley in the fall of 1975, the average number of college mathematics courses taken (other than Statistics 2) was about 1.1, with a standard deviation of 1.5. The histogram of the number of students who had taken each possible number of mathematics courses would be
- (a) approximately normal
  - (b) skewed
  - (c) not normal, but approximately symmetric
  - (d) impossible to give any meaningful information about
9. The standard deviation of a list of numbers is zero. What can you say about the numbers in the list?
10. In one study, it was necessary to draw a representative sample of Japanese-American resident in San Francisco. The procedure was as follows. After consultation with representative figures in the Japanese community, the four most representative blocks in the Japanese area of the city were chosen; all persons resident in those four blocks were taken for the sample. However, a comparison with Census data shows that the sample did not include a high-enough proportion of Japanese with college degrees. How can this be explained?





16. In a study of long distance runners, the mean weight was reported to be 63.1 kg with a standard deviation of 4.8 kg. The weights appear to be normally distributed.
- (a.) Estimate the percentage of the runners with a body weight of more than 65 kg.

(b.) If 95% of the long distance runners weigh more than Sam, what is Sam's weight?

17. The July 1997 issue of **Consumer Reports** has a report on vegetarian "burger patties." There were six "meat substitute" burgers; details on nutritional information are given in the table below. (The numbers were doctored just slightly to make computation easier, so we give alphabet letters in place of names.)

Identifier	Tasters' evaluation	price	calories	fat	sodium
A	very good	\$.91	110	4g	310mg
B	good	.68	90	0	420
C	Good	.92	80	1	280
D	Good	.92	80	5	280
E	Good	.88	90	0.5	410
F	Fair	.67	140	4.5	440

- (a) Compute the mean number of calories and mean fat content of these burgers.

- (b) Give a scatter-plot of calories and fat, using fat as the explanatory variable. Try to be neat and careful in drawing your scatter-plot

- (c) Compute the correlation between fat content and calorie content in veggie burgers.

- (d) Find the equation of the least squares regression line for predicting calories from fat content. Go up to part (b) and sketch it carefully in your scatter-plot.

- (e) Estimate the calorie content of a Veggie burger with 3 grams of fat.



- (f) What percentage of the variation in calorie content of a veggie burger is explained by (a linear relationship with) fat content? Does this make sense to you?
- (g) Plot the residuals of the regression line and explain whether they are consistent with a linear relationship between calories and fat.
- (h) Is it reasonable to say that the correlation between the tasters evaluation and the price is about zero? Why or why not?

18. The per pupil spending (in thousands of dollars) on education in 1990 in “East Coast States” is given in the table below.

Conn	7.93
Del	5.85
D.C.	7.41
Fla	5.05
GA	5.05
Me	5.58
Md	5.89
Mass	6.17
NC	4.39
NH	5.15
NJ	8.44
NY	8.09
Pa	5.67
RI	6.52
SC	3.73
VA	5.00
Vt	5.42
WVa	5.42

- (a) Draw a histogram or stem-plot of these data. Describe the shape of the histogram or stem-plot in words.

