

## Midterm

May 2

Your section: \_\_\_\_\_ Print your name: \_\_\_\_\_

Sign your name: \_\_\_\_\_

This is a closed book exam. However, you are allowed to bring two sheets (double-sided) of 8.5" × 11" paper with notes. The midterm exam consists of three problems, and there is a normal table provided at the end. The exam carries 54 points but the maximum you can score is 50. Good luck!

Problem:	.. 1 ..	.. 2 ..	.. 3 ....	Sum
Points:	20	16	18	56

**Problem 1.** The cuckoo is a common European bird noted for its characteristic call and its habit of laying its eggs in the nests of other birds, which hatch and rear the young cuckoos. The following table shows the distribution of the length of 243 cuckoos' eggs measured in millimeters.

<u>Length (in millimeters)</u>	<u>Percent</u>
19-21	8.0
21-22	22.0
22-23	40.0
23-24	22.0
24-26	8.0

- Plot the histogram for this data set. Show all intermediate work. Mark the horizontal and vertical scales carefully. Label the axes.
- You find a cuckoo's egg and its length is 23.2 millimeters. Is that above or below the median? Explain your answer.
- Estimate the mean length of a cuckoo's egg from the histogram.

( 10 + 5 + 5 = 20 points)



**Problem 2.** For each of the situations described below, fill in the blank with one of the following five options:

exactly  $-1$    somewhat negative   exactly  $0$    somewhat positive   exactly  $1$

Then explain briefly.

- (a) For the students taking Statistics 220 in Winter quarter 2001, the correlation coefficient between the score on the midterm and the score on the final will be \_\_\_\_\_.

Brief explanation:

- (b) Suppose that a class meets 30 days in a quarter. For each student in the class we record the number of days they were present and the number of days they were absent. The correlation co-efficient between the number of days present and the number of days absent is \_\_\_\_\_.

Brief explanation:

- (c) For the data set shown below, the correlation coefficient is \_\_\_\_\_.

x	y
1	10
1	-10
5	8
5	-8

Brief explanation:

(d) The correlation between temperature readings in Farenheit and temperature in Centigrade on a particular day at state capitals throughout the U.S will be \_\_\_\_\_ .

Brief explanation:

(4 × 4= 16 points)

**Problem .** In a very large class, the midterm had an average of 50 points with an SD of 20. The final scores averaged out to 60 with an SD of 15. The correlation between midterm and final scores was 0.5, and the scatter diagram was football-shaped.

- (a) Solly scores 60 on the midterm and 90 on the final. However, the instructor loses her midterm score and asks her to provide the score. Solly knows that the instructor will estimate her midterm score by the regression method if she refuses to cooperate. In order to maximize her score, should she cooperate or not? Answer with “yes” or “no”, and explain carefully. Show all your work.
- (b) If you considered the subpopulation of students that scored 50 on the midterm to the subpopulation of students that scored 52 on the midterm, how would the average score on the final for the first subpopulation be related to the average score on the final for the second subpopulation, in terms of the slope of the regression line of the final score on the midterm score ?
- (c) Estimate the percentage of students that scored between 30 and 70 on the midterm, assuming that the histogram for the midterm scores approximately follows the normal curve.

( 7 + 5 + 6 = 18 points)