

Practice Exam MATH 10 Spring 2006

(I wrote this **fast** there may be typos, if you are confused contact me ASAP - Prof. Leibon)

1. (10 points) The scatter plot shows five data points to the right given by dots. Not suprisingly the correlation for these five points is $r = 0$. Suppose *one* additional data point is added at one of the five positions indicated by a triangle. Match each of (a-e) wit the correct new correlation form the list given.
 - (a) -0.87
 - (b) -0.05
 - (c) 0
 - (d) -0.28
 - (e) 0.84
2. (10 points) Tell what each plot of the residual plots (Problem 2 figures 1-3) indicates about the appropriateness of the linear model.
3. (10 points) Every normal model is defined by its parameters, the mean and the standard deviation. For each model described below, find the missing parameter. (You would be given the table on page A-98 if this problem were on the actual exam).
 - (a) $\mu = 80$, 30% are below 70, $\sigma = ?$
 - (b) $\sigma = 12$, 10% are below 210, $\mu = ?$.
4. (15 points) How fast do squid swim? Atlantic Derby winners wee all greater than 5 nautical miles per hour, as shown in the graph. In fact, this graph shows the percentage of Derby winners that have swam slower than a given speed.
 - (a) Estimate the median winning speed.
 - (b) Estimate the quartiles.
 - (c) Estimate the range and the IQR.
 - (d) (5 points) Is the mean bigger or small than the median. Why?
5. (10 points) The figure Problem 5 figure 1 is a histogram of assets (in million of dollars) of 79 companies chosen from the Forbes list of the nation's top corporations.
 - (a) What aspect of this distribution makes it difficult to summarize, or to discuss, center or spread?
 - (b) In figures Problem 5 figures 2 and 3 are the same data after re-expressing as the square root of assets and the the logarithm of assets. Which re-expression "should" you prefer and why?

- (c) In the square root re-expression, what does the value 50 actually indicate about the company's assets?
 - (d) In the logarithm re-expression, what does the value 3 actually indicate about the company's assets?
6. (10 points) A 1975 article in the magazine *Science* examined the graduate admissions process at Berkeley for evidence of gender bias. The table below shows the number of applicants accepted to each of four graduate programs.

<i>Program</i>	<i>Males Accepted</i>	<i>Females Accepted</i>
1	511 of 825	89 of 108
2	352 of 560	17 of 25
3	137 of 407	132 of 375
4	22 of 373	24 of 341
<i>Totals</i>	1022 of 2165	262 of 849

- (a) What percent of the total applicants were admitted?
 - (b) Overall, were a higher percentage of males or females admitted?
 - (c) Compare the percentage of males and females admitted in each program.
 - (d) Which of the comparisons you made do you consider to be the most valid? Why?
7. (15 points) To study the perception of age among college students you had 67 Dartmouth students participate a version of our *Picture Experiment* that we performed in class. Each subject was presented with 10 pictures of people whose actual ages in years are given by

$$Actual = [17, 25, 29, 36, 42, 47, 50, 58, 63, 67].$$

To entice people to participate you advertise that the best guess will receive a gift certificate for a VerMonster™ at Ben and Jerry's. Foolishly, you forgot to account for the fact that their might be more than one "best guess", and two participants (Viridian and Insomnia) tied for your assessment of the best guess:

$$Viridian = [19, 22, 32, 36, 41, 44, 53, 55, 60, 65]$$

$$Insomnia = [17, 24, 30, 35, 42, 45, 58, 54, 66, 70]$$

- (a) You had intend to use the "simplest" ranking system and it resulted in this tie. What system did you use?
- (b) Describe a second ranking system that separates Viridian and Insomnia guess's. Based on our class data who will probably win and why?

- (c) Construct (fake!) summary statistics for the whole population that confirm (or deny) your suspicions in part (b).
- (d) You use your new ranking system to break ties and you contact the winner, tell her the Actual ages, and give her the Ben Jerry's gift certificate. Unbeknownst to you Viridian and Insomnia are roommates! The loser is confused, upset, and without ice cream. So she contacts to you. How do you explain your system to her?



