MATH 158 Test 4 (Chapters 8.5 - 12.6)

Show all your work. No work no credit.

1. (15 pts.) An experiment was conducted to test the effects of alcohol. The errors were recorded in a test of visual and motor skills for a treatment group of people who drank ethanol and another group given a placebo. The results are shown in the accompanying table. Use a 0.05 significane level to test the claim that the treatment group has scores that vary more than the scores of the placebo group.

Treatment Group	Placebo Group
$n_1 = 22$	$n_2 = 22$
$\overline{x}_1 = 4.20$	$\overline{x}_2 = 1.71$
$s_1 = 2.20$	$s_2 = 0.72$

2. (15 pts.) 11 runners are timed at the 100-meter dash and are timed again one month later after following a new training program. the times in seconds are shown in the table. Use a significance level of 0.05 to test the claim that the training has no effect on the times. (Use Wilcoxon signed-ranks test).

Before	12.1	12.4	11.7	11.5	11.0	11.8	12.3	10.8	12.6	12.7	10.7
After	11.9	12.4	11.8	11.4	11.2	11.5	12.0	10.9	12.0	12.2	11.1

3. The paired data consist of the costs of advertising (in thousands of dollars) and the number of products sold (in thousands):

Cost	9	2	3	4	2	5	9	10
Number	85	52	55	68	67	86	83	73

a) (8 pts) Find the correlation coefficient r and explain what it means in terms of correlation between cost and number of products sold in the sample.

b) (7 pts.) Use a 5% level of significance to determine if there is significant correlation between cost and number of products sold in the population.

4. (15 pts.) The data in the accompanying table summarize results from tests of accuracy of polygraphs. Use a 0.05 level of significance to test the claim that whether the subject lies is independent of the polygraph indication. What do the results suggest about the effectiveness of polygraphs?

	Polygraph indicated truth	Polygraph indicated Lie
Subject actually told the truth	65	15
Subject actually told a Lie	3	17

5. (15 pts.) A standard aptitude test is given to several randomly selected programmers, and the scores are given below for the mathematics and verbal portions of the test. Use the Sign Test to test the claim that programmers do better on the mathematics portion of the test. Use a 0.05 level of significance.

Math	347	440	327	456	427	349	377	398	425
Verbal	285	378	243	371	340	271	294	322	385

6. Listed below are heights (in inches) and weights (in pounds) for supermodels Niki Taylor, Nadia Avermann, Claudia Schiffer, Elle MacPherson, Christy Turlington, Bridget Hall, Kate Moss, Valerie Mazza, and Kristy Hume.

Height (in.)	71	70.5	71	72	70	70	66.5	70	71
Weight (lb)	125	119	128	128	119	127	105	123	115

a) (7 pts) Use your graphing calculator to find the regression $\widehat{y} = b_0 + b_1 x$

b) (8 pts) Use the regression equation from part a) to find the best predicted weight of a supermodel who is 69 inches tall.

7. (15 pts.) A teacher uses two different programs to remediate students. Results for each group on a standardized test are listed below. At the 0.05 level of significane, Use the Wilcoxon rank-sum to test the claim that the two independent samples come from the same distribution.

Program 1	Program 2
60 75 61 63	66 89 68 77
86 69 64 70	84 80 81 87
72 82 59	78 73 91 93
	94 95