Stat 333

Lab #4

Answers may vary due to rounding.

1. From a sample of 489 17-year-old males and a sample of 469 17-year-old females, the average hematocrit level was 45.8 with a standard deviation of 2.8 and 40.6 with a standard deviation of 2.9.
   (a) (i) Construct a 95% confidence interval for the male-female difference in population averages. Interpret. What does this interval tell you?
   (4.8383, 5.5617) df = 950.3871
   (ii) Is the average hematocrit level for males higher than that for females? Set up the appropriate test. (t=28.2157,p-value <.0001, Rho)
   (iii) What type of error could have been committed in **(ii)**?
   (b) Assuming that population variances are equal,
   (i) construct a 95% confidence interval for the male-female difference in population averages. Interpret (4.8383, 5.5614) df=956
   (ii) Is the average hematocrit level for males higher than that for females? Set up the appropriate test(t=28.2364, p-value<.0001, Rho)

2. A fish-processing company is concerned about the shelf life of its new cat food. A sample examined in Halifax (n=35) had an acceptable mean shelf life of 13 months, with a standard deviation of 1.44 months. But a second sample, examined in Dartmouth (n=40), had a mean shelf life of only 11 months, with a standard deviation of 1.52 months. The manager in Dartmouth claims that there is not significant difference between these two means.
   (a) Test her claim. Based on the result, should the operation in Dartmouth be subjected to a special review? (t= 5.8469, df=72.5197, p-value<.0001, Rho)
   (b) What type of error could have been committed in **(a)**?
   (c) Construct a 95% CI for the difference between the population means. Interpret this interval. Does this suggest that there is a significant difference between the two population means?(1.3182, 2.6818)

3. When testing for a difference between the means of a treatment group and a group given a placebo, the accompanying display is obtained.

	Placebo	**Treatment**
Sample Mean	152.0739	154.9669
SampleVariance	438.4388	239.1451
Sample size	50	50

   (a) Is there sufficient evidence to support the claim that the treatment group comes from a population with a mean that is greater than the mean for the placebo population? Explain. (t=.7858, df= 90.1971, p-value =.2170, FtRho)
   (b) At what levels of significance would you come to a different conclusion in **(a)**?

4. Sample data were collected to compare the ages of CEOs of top growth companies in western Canada and Quebec, shown in table below.

Western Canada	38	54	40	41	34	59	37	35	48	35	35	59
Quebec	40	31	38	40	34	36	35	33	39	38		

(a) Test to see if the mean age for CEOs in Western Canada is significantly higher than the mean for Quebec. What assumptions did you make? (t= 2.2257, df=13.6832, p-value = 0.217, Rho)

(b) Test to see if the age for CEOs in Western Canada is higher than that of Quebec. Use a non-parametric test. What assumptions did you make? (Us= 83, .05< p-value < .10 FtRHo)

5. Captopril is a drug designed to lower systolic blood pressure. When subjects were tested with this drug, their systolic blood pressure reading (in millimetres of mercury) were measured before and after the drug was taken, with the results given in the accompanying table.

Subject	1	2	3	4	5	6	7	8	9	10	11	12
Before	200	174	198	170	179	182	193	209	185	155	169	210
After	196	170	177	166	159	151	176	183	159	145	149	177

(a) Use the sample data to construct a 99% confidence interval for the mean difference between the before and after reading. (8.6669, 27.3331)

(b) Is there sufficient evidence to support the claim that Captopril is effective in lowering systolic blood pressure on average? What assumptions were made? (t=5.9899, df=11, p-value <.0001, Rho)

(c) Is there sufficient evidence to support the claim that Captopril is effective in lowering systolic blood pressure? Use the sign test. What assumptions were made? ($B_s = 12, n_d = 12, p-value < .0005, RHo$)

(d) Is there sufficient evidence to support the claim that Captopril is effective in lowering systolic blood pressure? Use the other non-parametric test. What assumptions were made($W_s = 66, n_d = 12, 0.01 < p-value < .025, RHo$)

6. In a study of hunger, men were asked to rate how hungry they were at the end of each two-week period and differences were conmputed (hunger rating whenb taking a drug – hunger rating when taking the placebo). The distrigbution of the differences was not normal. Out of 10 men who recorded hunger ratings, 3 reported greater hunger on the drug than on the placebo, 5 reported lower hunger on the drug than on the placebo and 2 did not record any change. Conduct an appropriate test at $\alpha = 0.05$. Is there any difference? ($B_s = 5, n_d = 8, p-value > .20, FtRHo$)

7. In May 1997, Calgary-based Bre-X Minerals collapsed when its gold assets were revealed to be dramatically less than had been claimed. Did this collapse affect the prices of other mining stocks?

(a) Using the price data below, construct a 98% confidence interval for the mean difference of their pre-crash prices and their prices three months later.

Stock	1	2	3	4	5
Before the crash	1.4	1.2	1.15	0.225	2.73
After the crash	0.7	0.5	0.41	0.280	2.06

(b) Does this data support the claim that the prices of mining stocks dropped on average during the period? Set up the hypothesis test. What assumptions were made? (t=3.627, df=4, p-value=0.0111, Rho)
(c) Does this data support the claim that the prices of mining stocks dropped during the period? Use the less powerful non-parametric test. What assumptions were made?(Bs=4, p-value>.2, FtRho)
(d) Does this data support the claim that the prices of mining stocks dropped during the period? Use the more powerful non-parametric test. What assumptions were made? (Ws = 14, .10<p-value<.2, FtRho)

8. The table below consists of sample data obtained when 14 subjects are tested for reaction times with their left and right hands. (only right-handed subjects were used.)

Subject	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Right hand	191	97	116	165	116	129	177	155	112	102	188	158	121	133
Left Hand	224	171	191	207	196	165	177	165	140	188	155	219	177	175

(a) Test to see if there is no significant difference in the reaction times for left and right hands. (t=-4.6772, df=13, p-value<.0001, Rho)
(b) Construct a 95% confidence interval for the mean difference for the reaction time for the right and left hand.(-61.61, -22.68)
(c) Test to see if there is no significant difference in the reaction time using the sign test. (Bs=12, .002<p-value<.01)
(d) Test to see if there is no significant difference in the reaction time using the Wilcoxon-signed-Rank test. (Ws=87.5, .001<p-value<.002)