1. A group of 10 men were given a special diet for two weeks to test weight loss in pounds. The observed data was:

Man	Weight before diet	Weight after diet
1	181	178
2	171	172
3	190	185
4	187	184
5	210	201
6	202	201
7	166	160
8	173	168
9	183	180
10	184	179

To determine if the data provide sufficient evidence to indicate the special diet leads to a weight loss, the appropriate test procedure is either:

a. two sample t-test or Wilcoxon Rank Sum test
b. paired t-test or Wilcoxon Signed Rank test
c. paired t-test or Wilcoxon Rank Sum test
d. two sample t-test or Sign test
e. two sample t-test or paired t-test

2. A manufacturer wished to compare the wearing qualities of two different types of automobile tires, A and B, and he had 5 cars available for use in an experiment. To make the comparison, one tire of Type A and one of Type B were mounted on the rear wheels of each of the five automobiles.(For each car, a coin was flipped to decide which tire would be mounted on the left side and which would be mounted on the right.). The automobiles were then operated for a specified number of miles and the amount of wear was recorded for each tire. These measurements appear below:

Automobile	Tire A	Tire B
1	10.6	10.2
2	9.8	9.4
3	12.3	11.8
4	9.7	9.1
5	8.8	8.3

An appropriate parametric procedure is to be used for testing the null hypothesis that there is no difference in the average wear for the two types of tires. The absolute value of the test statistic calculated from the data is:

a. 12.83
b. 0.57
c. 8.35
d. 10.72
e. 9.45

3. A marine biologist wants to test the effect of water temperature on the average dive duration for sea otters. Five otters are available for an experiment and each otter is observed diving in both warm and cold water (with the order being random). The biologist collects the following data:

	Dive Duration (sec.)	
	Warm	Cold
Otter	Water	Water
J2	97	92
B7	65	60
M3	75	77
D4	103	43
B8	90	81

Test for any difference in the length of dives using a non-parametric procedure:

a. Rank-sum procedure, Wcold = 25 p-value > .111.
b. Rank-sum procedure, Wcold = 25 p-value > .222
c. Signed-rank procedure, W- = 1 p-value = .062
d. Signed-rank procedure, W- = 1 p-value = .124
e. Sign-test, S = 4 p-value = .187

4. A paired difference experiment is conducted to compare the starting salaries of male and female college graduates who find jobs. Pairs are formed by choosing a male and a female with same major and similar grade-point averages. Suppose a random sample of 5 pairs and the starting salaries (in thousands) are as follows:

Pair	1	2	3	4	5
Male	25.9	20.0	28.7	13.5	18.8
Female	24.9	18.5	27.7	13.0	17.8

To test whether the mean starting salary for males is less than that of females with α = 0.05, the absolute value of the test statistic is:

a. 1
b. 0.125
c. 0.3535
d. 5.658
e. 6.3246

The next two questions refer to the following situation:

The average height of children is believed to have increased in the last 50 years due to better nutrition and better health services. To examine this hypothesis, measurement of the heights (in centimeters) of10 pairs of mothers and their eldest adult daughters yielded the following results:

Pair	Mother	Daughter	Pair	Mother	Daughter
1	178.2	178.2	6	166.6	172.8
2	173.4	168.6	7	157.4	152.0
3	163.0	164.2	8	176.4	176.4
4	152.2	157.4	9	162.0	159.4
5	155.8	165.2	10	165.1	159.0

5. Consider the differences computed by taking the mother's height - the daughter's height. The value of the Signed-Rank test statistic is:

a. 36
b. 19
c. 16
d. 6
e. 20

6. The rejection region at α =0.05 is:

a. reject if the test statistic 25

b. reject if the test statistic 210
c. reject if the test statistic 23
d. reject if the test statistic 28
e. reject if the test statistic 21

7. A sample of 8 patients had their lung capacity measured before and after a certain treatment with the following results:

Patient	Before	After
1	750	850
2	860	880
3	950	930
4	830	860
5	750	800
6	680	740
7	720	760
8	810	800

The Sign Test is used to test the hypothesis that the treatment provides no increase in lung capacity. The probability, under H0, of obtaining the observed result or a more extreme one (i.e. the p-value or observed level of significance) is:

a. .0352
b. .1094
c. .0498
d. .1445
e. .2980

8. Seven sets of identical twins are given psychological tests to determine whether the firstborn of the twins tends to be more aggressive than the second born. The results are shown in the following table, where the higher score represents greater aggressiveness.

Set	Firstborn	Second born	Difference
1	86	88	-2
2	77	65	12
3	91	90	1
4	70	65	5
5	75	80	-5
6	88	81	7
7	87	72	15

If we are willing to assume that the distribution of differences is symmetric about the median but not necessarily normal, then the value of the appropriate test statistic is:

a. 22.5 and we would reject H_0 at $\alpha = .05$
b. 40 and we would reject H_0 at $\alpha = .05$
c. 1.71 and we would not reject H_0 at $\alpha = .05$
d. 22.5 and we would not reject H_0 at $\alpha = .05$
e. 1.71 and we would reject H_0 at $\alpha = .05$.

9. The following data give uric acid levels (in milligrams per 100 milliliters) for 5 subjects before and after a special diet.

Subject	Before	After
1	5.2	5.2
2	6.3	6.2
3	6.4	6.3
4	5.5	5.6
5	5.9	5.6

To test the hypothesis that the diet reduces the uric acid level, we might use

a. a two sample t-test since the uric acid levels before and after the diet can be assumed independent.
b. a sign test
c. a paired t-test
d. a and b
e. b and c