Quiz 12, Attempt 2

Suppose you observe IQs of 77, 88, 90, and 95 from a group of four subjects. Then, after taking NZT, the same three subjects get scores of 76, 90, 99, and 100, respectively. Give the p-value for the sign test based on a **one-sided** alternative (NZT improves IQ). Also give the p-value for the signed-rank test based on a **one-sided** alternative (NZT improves IQ).

Sign test: p-value = $P(BIN(4, \frac{1}{2}) \geq 3)$

Signed-rank test: p-value = $\frac{2}{16} = \frac{1}{8}$

1	2	3	4	t
+	+	+	+	10
−	+	+	+	9
		⋮		

Quiz 13, Attempt 2

13. Twelve pairs of twin male lambs were selected; diet plan I was given to one twin and diet plan II to the other twin in each case. The weights at eight months were as follows.

Diet I:	111	102	90
Diet II:	97	90	96

Test if diet plan 1 produces similar weights to diet plan 2 against the alternative that diet plan 1 produces heavier lambs. Find the p-value from a paired sign test. Also find the p-value from a paired signed-rank test.

paired sign test: p-value = $P(BIN(3, \frac{1}{2}) \geq 2)$

paired signed-rank test: p-value = $\frac{1}{4}$

Name:

Quiz 14, Attempt 1

Suppose you observe IQs of 77, 88, 90, and 95 from a group of four subjects. Then, after taking NZT, the same three subjects get scores of 76, 90, 99, and 100, respectively. We want to test if NZT improves IQ by more than 1.5 points. Use the test statistic $\sum 1\{(D_i - 1.5) > 0\} (D_i - 1.5)$ to test the null hypothesis that the distribution of differences is symmetric about 1.5. Give the p-value based on a **one-sided** alternative (NZT improves IQ).

After	76	90	99	100
Before	77	88	90	95
$d_i - 1.5$	-2.5	0.5	7.5	3.5

0.5	2.5	3.5	7.5	t
+	+	+	+	14
-	+	+	+	13.5
+	-	+	+	(11.5)
-	-	+	+	.
		-	+	.
	.	-	+	.
	.	-	+	
	.	-	+	

. . .

p-value = 3/16

Name:

Quiz 15, Attempt 1

Strikethrough all of the statements that are false.

The paired sign test is less powerful than the paired signed-rank test.

The paired signed-rank test is less powerful than the paired t-test.

Paired tests are simply single-sample tests conducted on differences.

The paired signed-rank test is nearly as powerful as the paired t-test.

The sign test is less sensitive to outliers than the signed-rank test.

The signed-rank test is not very sensitive to outliers.

The signed-rank test is used to test whether a population is symmetrically distributed around zero.

The sign test is used to test whether a population distribution is equally likely to be above versus below zero.

The paired test we discussed in class, with the test statistic being the sum of positive differences, is sensitive to outliers.

Non-parametric tests tend to be less powerful and less sensitive to outliers than their parametric counterparts.

Non-parametric tests do not require the population distribution to be from a specific family in order to be valid.

Non-parametric confidence intervals tend to be wider than their parametric counterparts.

For a population with a continuous distribution, the sign test can be thought of as a test of the median.

For a population with a continuous distribution, the sign test can be though of as a test of the first quartile.

Simulating the results of an experiment 10,000 times and determining the proportion of times the p-value falls below the significance level provides an estimate of the power of the test.

The p-value from a sign test can be expressed in terms of a binomial distribution.

The p-value from a signed-rank test cannot be expressed in terms of a binomial distribution.

The p-value from a signed-rank test is determined from a table having 2^n rows, where n is the sample size.

Even if both one-sided p-values are larger than ½, the two-sided p-value will not be higher than 1.

All are true.