Practice Problems:

Problem 14.5 Specify the test statistic and the rejection region for the Wilcoxon signed rank test for the paired difference design in each of the following situations:

1. H_0: Two probability distributions, A and B are identical
   H_a: Probability distribution for population A is shifted to the left of that for population B
   $n = 20, \ \alpha = 0.01$

2. H_0: Two probability distributions, A and B are identical
   H_a: Probability distribution for population A is shifted to the left or right of that for population B
   $n = 30, \ \alpha = 0.1$

3. H_0: Two probability distributions, A and B are identical
   H_a: Probability distribution for population A is shifted to the right of that for population B
   $n = 45, \ \alpha = 0.05$

Problem 14.6 Children completing the sixth grade at a school located in a large city have the choice of going to one of two junior high schools, A or B. Members of the school board want to compare the academic effectiveness of the two schools. The parents of six sets of identical twins agree to send one child to school A and the other to school B. Since each set of twins is in the same class at each grade level through the sixth grade, a paired difference design could be employed. Near the end of the ninth grade, an achievement test is given to each child in the experiment. The results are given in the following table. Test to determine whether there is evidence of a difference (shift in location) in the probability distribution of achievement test scores at the two schools at level $\alpha = 0.1$.

Twin pair	A	B	Twin pair	A	B
1	65	69	4	50	52
2	72	72	5	60	47
3	86	74	6	81	72