Stat 296 Fall 2007
The Kruskal-Wallis Test

Example: For Example 3.1.1 on page 81, we can apply the Kruskal-Wallis test to the ranks. The data is as follows:

Samples from normal populations with $\mu_1 = 15$, $\mu_2 = 25$, $\mu_3 = 30$, $\sigma = 9$.

Treatment 1	6.08	22.29	7.51	34.36	23.68
Rank 1	1	3	2	13	5
Treatment 2	30.45	22.71	44.52	31.47	36.81
Rank 2	9	4	15	10	14
Treatment 3	32.04	28.03	32.74	23.84	29.64
Rank 3	11	7	12	6	8

Since there are 756,756 possible permutations, the exact Kruskal-Wallis test will take a significant amount of time to run. Instead, we use the MC option which randomly samples 10,000 permutations.

```
data oct18;
input treat resp @@;
cards;
1 1 1 3 1 2 1 13 1 5
2 9 2 4 2 15 2 10 2 14
3 11 3 7 3 12 3 6 3 8
;
proc npar1way data=oct18 anova scores=data;
class treat;
exact scores=data /MC; /* The MC option randomly samples the permutations */
var resp;
run;
```

The first and third screens displayed by SAS are as follows.

```
                    The NPAR1WAY Procedure

          Analysis of Variance for Variable resp
               Classified by Variable treat

          treat              N                 Mean
          ----------------------------------------
          1                  5                 4.80
          2                  5                10.40
          3                  5                 8.80


Source     DF    Sum of Squares     Mean Square      F Value     Pr > F
-------------------------------------------------------------------------
Among       2             83.20           41.60       2.5366     0.1206
Within     12            196.80           16.40
```

The NPAR1WAY Procedure

Monte Carlo Estimate for the Exact Test

Pr >= Chi-Square	
Estimate	0.1281
99% Lower Conf Limit	0.1195
99% Upper Conf Limit	0.1367
Number of Samples	10000
Initial Seed	725846367

In this case, we find a p-value of 0.1281. This is not very significant evidence to reject H_0.