**Chapter 4**

**Introduction to Probability**

**Case Problem: Hamilton County Judges**

The data in the table provides the basis for the analysis. We provide notes as a guide to answering questions 1 through 5.

1. The conditional probabilities of cases being appealed in the three courts are given in the 3 Total rows in the table. For Common Pleas Court, the probability of an appeal is .0401; for Domestic Relations Court, the probability of an appeal is .00348; and for Municipal Court, the probability of an appeal is .00461. Appeals are much more likely in Common Pleas Court. But, even there, only 1 in 25 cases are appealed. The unconditional probability of an appeal across all 3 courts is

(1762 + 106 + 500)/(43,945 + 30,499 + 108,464) = .0129.

2. The probability of a case being appealed for each judge is given in column 5 of the table. Judges Winkler, Panioto and Grady have the lowest probability of appeal for Common Pleas, Domestic Relations and Municipal Courts respectively.

3. The probability of a case being reversed for each judge is given in column 7 of the table. Judges Winkler, Panioto and Grady/Hair have the lowest probability of reversal for Common Pleas, Domestic Relations and Municipal Courts respectively. These are the probabilities for reversal for all cases disposed of, not just the ones appealed.

4. The probability of a reversal given an appeal for each judge is given in column 9 of the table. Judges Nurre, Panioto and Grady/Hair have the lowest probability of reversal for Common Pleas, Domestic Relations and Municipal Courts respectively.

5. We describe here how *The Cincinnati Enquirer* used this data to rank the judges. Other approaches may also be valid, but a rationale should be provided. The newspaper provided ranking for each judge within each of the courts on percentage of cases appealed, percentage of cases reversed and percentage of appealed cases reversed. Those rankings were the same as the ones we have computed based on probabilities in columns 6, 8 and 10 of the table. Then they summed the 3 rankings to come up with a total ranking for each judge. We provide those total ranks in column 11 of the table. Judge Winkler is the highest ranked judge in Common Pleas Court, Judge Panioto is the highest ranked judge in Domestic Relations Court and Judge Grady is the highest ranked judge in Municipal Court.

Common Pleas Court



Domestic Relations Court



Municipal Court

