Math 116

Homework due March 10, 2009 at 11:10AM

A counting problem:

Let Ω be the set of 5-card hands, drawn from a standard 52-card deck, in which the ranks of the cards are all distinct. Let E be the set of 5-card hands for which all cards come from a single suit. Let F be the set of 5-card hands in which the ranks are consecutive. Thus the hands in E are the flushes, straight flushes and royal flushes. Similarly, the hands in F are the straights, straight flushes and royal flushes. The hands in $E \cap F$ are the straight flushes and royal flushes. The two sets E and F are subsets of Ω.

a. Calculate the number of elements in each of the following sets: E, F, $E \cap F$, Ω.

b. Suppose that Ω is regarded as a probability space in the natural way: each hand in Ω is assigned the same probability. Calculate the probabilities $\Pr(E)$, $\Pr(F)$, $\Pr(E \cap F)$.

c. Are the two events E and F independent? If not, can you explain why $\Pr(E|F)$ should be different from $\Pr(E)$?

Problems from the book:

4.9, 4.20a c, 4.21, 4.22, 4.23, 4.24, 4.25, 4.27, 4.29