Section 5.4, Exercise 30

Multiple Jobs  According to the U.S. Census Bureau of Labor Statistics, there is a 5.84% probability that a randomly selected employed individual has more than one job (a multiple-job holder). Also, there is a 52.6% probability that a randomly selected employed individual is male, given that he has more than one job. What is the probability that a randomly selected employed individual is a multiple job holder and is male? Would it be unusual to randomly select an employed individual who is a multiple-job holder and male?

\[ P(\text{multiple-job and male}) = P(\text{multiple-job})P(\text{male | multiple-job}) \]
\[ = (0.0584)(0.526) \]
\[ = 0.0307 \]

Since \( P(\text{multiple-job and male}) = 0.0307 < 0.05 \) it would be unusual to randomly select a multiple-job holder who is male.

Section 5.4, Exercise 33

A Flush  A flush in the card game of poker occurs if a player gets five cards that are all of the same suit (clubs, diamonds, hearts, or spades). Answer the following questions to obtain the probability of being dealt a flush in five cards.

(a) We initially concentrate on one suit, say clubs. There are 13 clubs in a deck. Compute \( P(\text{five clubs}) = P(\text{first card is clubs and second card is clubs and third card is clubs and fourth card is clubs and fifth card is clubs}) \).

\[ P(\text{five clubs}) = \frac{\binom{13}{5}}{\binom{52}{5}} \]
\[ = \frac{1287}{2598960} \]
\[ = 0.000495198 \]
(b) A flush can occur if we get five clubs or five diamonds or five hearts or five spades. Compute \( P(\text{five clubs or five diamonds or five hearts or five spades}) \). Note events are mutually exclusive.

\[
P(\text{flush}) = \frac{(\binom{4}{1}) (\binom{13}{5})}{\binom{52}{5}} = \frac{5148}{2598960} = 0.00198079
\]

Section 5.4, Exercise 34

A Royal Flush A royal flush in the game of poker occurs if the player gets the cards Ten, Jack, Queen, King, and Ace all in the same suit. Use the results of Problem 33 to compute the probability of being dealt a royal flush.

There is only one royal flush in each suit and four suits in a standard deck, thus

\[
P(\text{royal flush}) = \frac{4}{2598960} = 1.53908 \times 10^{-6} = 0.00000153908.
\]

Section 5.4, Exercise 38

Independent? Refer to the contingency table in Problem 18 (reproduced below) that relates to cigar smoking and deaths from cancer. Determine \( P(\text{died from cancer}) \) and \( P(\text{died from cancer} \mid \text{current cigar smoker}) \). Are the events “died from cancer” and “current cigar smoker” independent?

<table>
<thead>
<tr>
<th>Died from Cancer</th>
<th>Did Not Die from Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never smoked cigars</td>
<td>782</td>
</tr>
<tr>
<td>Former cigar smoker</td>
<td>91</td>
</tr>
<tr>
<td>Current cigar smoker</td>
<td>141</td>
</tr>
</tbody>
</table>

\[
P(\text{died from cancer}) = \frac{1014}{137243} = 0.00738835
\]

\[
P(\text{died from cancer} \mid \text{current cigar smoker}) = \frac{141}{7866} = 0.0179252
\]

The events “died from cancer” and “current cigar smoker” are not independent since

\[
P(\text{died from cancer}) \neq P(\text{died from cancer} \mid \text{current cigar smoker}).
\]
Section 5.5, Exercise 38

Stocks on the NASDAQ Companies whose stocks are listed on the NASDAQ stock exchange have their company name represented by either four or five letter (repetition of letters is allowed). What is the maximum number of companies that can be listed on the NASDAQ?


Section 5.5, Exercise 70

Acceptance Sampling Suppose you have just received a shipment of 100 televisions. Although you don’t know this, 6 are defective. To determine whether you will accept the shipment, you randomly select 5 televisions and test them. If all 5 televisions work, you accept the shipment; otherwise, the shipment is rejected. What is the probability of accepting the shipment?

\[P(\text{accept}) = \frac{94C_5}{100C_5} = \frac{54,891,018}{75,287,520} = 0.729085\]