Discussion Session # 3

Exercise 4.2.4
Construct a sample space for each of the following experiments.

(a) Someone claims to be able to taste the difference among bottled, tap and canned draft beer of the same brand. A glass of each is poured and given to the subject in an unknown order. The subject is asked to identify the contents of each glass. The number of correct identifications will be recorded.

(b) Record the number of traffic fatalities in a state next year.

(c) Observe the length of time a new video recorder will continue to work satisfactorily without service.

Exercise 4.2.14
Suppose you are eating at a pizza parlor with two friends. You have agreed to the following rule to decide who will pay the bill. Each person will toss a coin. The person who gets a result that is different from the other two will pay the bill. If all three tosses yield the same result, the bill will be shared by all. Find the probability that

(a) Only you will have to pay.

(b) All three will share.

Exercise 4.2.17
The medical records of the male diabetic patients reporting to a clinic during one year provide the following counts.

<table>
<thead>
<tr>
<th>Age of Patient</th>
<th>Light Diabetic parents</th>
<th>Serious Diabetic parents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Below 40</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Above 40</td>
<td>15</td>
<td>20</td>
</tr>
</tbody>
</table>

Suppose a patient is chosen at random from this group, and the events $A$, $B$ and $C$ are defined as

$A = \{\text{He has a serious case}\}$

$B = \{\text{He is below 40}\}$

$C = \{\text{His parents are diabetic}\}$

(a) Find the probabilities $P(A)$, $P(B)$, $P(BC)$, $P(ABC)$.

(b) Describe the following events verbally and find their probabilities:
   
   (i) $\bar{A}B$
   
   (ii) $A$ or $B$
   
   (iii) $\bar{A}B\bar{C}$

(c) Bonus problem: Find whether seriousness and age are independent, i.e. whether $P(AB)$ is equal to $P(A)P(B)$. Calculate $P(A|B)$ and $P(A|\bar{B})$.

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1I misread the book and solved a different problem!! Originally these were probabilities.