MGF 1106 – Section 12.7 - CONDITIONAL PROBABILITIES

If you are asked to find the probability of Event 1 given that Event 2 has occurred, you must make an adjustment to your sample space. The size of the sample space (total number of outcomes) will be reduced based on the knowledge that E2 has occurred. Conditional probability is written P(E1|E2) - read probability of E1 given E2.

Examples:

A. Drawing from a deck. If one card is drawn from a regular card deck, determine the following probabilities.
   1. P(ace of hearts)
   2. P(ace of hearts|red)
   3. P(queen)
   4. P(queen|face card)
   5. P(queen|red)

B. Using a chart: A recent survey of Chipola students indicates the following results for type of soda preferred:

<table>
<thead>
<tr>
<th></th>
<th>Regular Cola</th>
<th>Diet Cola</th>
<th>No Cola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshmen</td>
<td>40</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>Sophomores</td>
<td>30</td>
<td>30</td>
<td>20</td>
</tr>
</tbody>
</table>

Determine the following probabilities:
   1. P(cola)
   2. P(cola|freshman)
   3. P(sophomore)
   4. P(sophomore|diet cola)
   5. P(diet cola)
   6. P(diet cola|not sophomore)

C. Using tree diagrams: A family plans to have three children. Make a tree diagram for the sample space. Determine the following probabilities:
   1. P(at least two girls)
   2. P(at least two girls|the first child is a girl)
   3. P(three girls)
   4. P(three girls|first child is a girl)
   5. P(exactly two boys)
   6. P(exactly two boys|at least one boy).

HW: Pg 626 Problems 5 -10, 23-28, 35-42, 49-54