Mrs. Daniel - AP Stats  
5.3 WS #2

Picking Two Sneezers
This is a two-way table that classified 40 students according to their gender and whether they had allergies.

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergies</td>
<td>10</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>No Allergies</td>
<td>13</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>17</td>
<td>40</td>
</tr>
</tbody>
</table>

Suppose we chose 2 students at random.

a. Draw a tree diagram or chart that shows the sample space for this chance process.

b. Find the probability that both students selected suffer from allergies.

\[
\frac{18}{40} \cdot \frac{17}{39} = 0.19615
\]

c. Find the probability that neither student selected suffers from allergies.

\[
\frac{22}{40} \cdot \frac{21}{39} = 0.29615
\]

d. Find the probability that at least one student selected suffers from allergies.

\[
1 - \text{no allergies} = 1 - \frac{22}{40} \cdot \frac{21}{39} = 0.70385
\]

e. Find the probability that only one student selected suffers from allergies.

\[
\frac{22}{40} \cdot \frac{18}{39} = 0.25385 \quad \text{can be allergies 1st \ OR \ no allergies 2nd}
\]

\[
\frac{22}{40} \cdot \frac{18}{39} \quad \text{can be allergies 1st OR no allergies 2nd}
\]

\[
\frac{22}{40} \cdot \frac{18}{39} \quad \text{can be allergies 1st OR no allergies 2nd}
\]

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\frac{22}{40} \cdot \frac{18}{39} \quad \text{can be allergies 1st OR no allergies 2nd}
\]
Media Usage and Good Grades

In January 2010, the Kaiser Family Foundation released a study about the influence of media in the lives of young people ages 8-18 (http://www.kff.org/entmedia/mh012010pkg.cfm). In the study, 17% of the youth were classified as light media users, 62% were classified as moderate media users and 21% were classified as heavy media users. Of the light users who responded, 74% described their grades as good (A’s and B’s), while only 68% of the moderate users and 52% of the heavy users described their grades as good.

a. According to this study, what percent of young people ages 8-18 described their grades as good? Use a tree diagram or chart to calculate the probability.

```
light 0.17
  good 0.74 = 0.1258
  bad 0.26 = 0.0442
mod 0.62
  good 0.68 = 0.4216
  bad 0.32 = 0.1984
heavy 0.21
  good 0.52 = 0.1092
  bad 0.48 = 0.1008
```

b. According to the tree diagram you constructed above, what percent of students with good grades are heavy users of media?

\[
\frac{0.1092}{0.1258 + 0.4216 + 0.1092} = \frac{0.1092}{0.6566} = 0.1663
\]

c. What percent of students with good grades are moderate users?

\[
\frac{0.4216}{0.6566} = 0.6421 \rightarrow 64.21\%
\]

d. What percent of light users are students with bad grades?

\[
\frac{0.0442}{0.17} = 0.26
\]

e. What percent of moderate users are students with bad grades?

\[
\frac{0.1984}{0.62} = 0.32
\]