AP Stats: Quideo #3

Basic Question:
Below are the proportions of the most popular colors for vehicles made in North America in 2000.

<table>
<thead>
<tr>
<th>Color:</th>
<th>Silver</th>
<th>White</th>
<th>Black</th>
<th>Dark Green</th>
<th>Dark Blue</th>
<th>Medium Red</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability</td>
<td>0.176</td>
<td>0.172</td>
<td>0.113</td>
<td>0.089</td>
<td>0.088</td>
<td>0.067</td>
</tr>
</tbody>
</table>

a) What is the probability that the vehicle you choose has any color other than the six listed?

b) What is the probability that a randomly chosen vehicle is either silver or white?

c) When choosing two vehicles at random, what is the probability that both are silver or both are white?

Advanced Question:

Will taking antioxidants help prevent colon cancer? People who eat lots of fruits and vegetables have lower rates of colon cancer than those who eat little of these foods. Fruits and vegetables are rich in “antioxidants” such as vitamins A, C, and E. Will taking antioxidants help prevent colon cancer? A clinical trial studied 864 people who were at risk of colon cancer. The subjects were divided into four groups: daily beta-carotene, daily vitamins C and E, all three vitamins every day, and daily placebo. After four years, the researchers were surprised to find no significant difference in colon cancer among the groups.

a) What are the explanatory and response variable in this experiment?

b) Outline the design of the experiment. Use your best judgment in choosing the group sizes.

c) Assign labels to the 864 subjects and use Table B, starting at line 118, to choose the first 5 subjects for the beta-carotene group.

d) The study was double blind. What does this mean in the context of this problem?

e) Suggest some lurking variables that could explain why people who eat lots of fruits and vegetables have lower rates of colon cancer. The experiment suggests that these variables, rather than the antioxidants, may be responsible for the observed benefits of fruits and vegetables.
AP Question:

Two antibiotics are available as treatment for a common ear infection in children.

- Antibiotic A is known to effectively cure the infection 60 percent of the time. Treatment with antibiotic A costs $50.
- Antibiotic B is known to effectively cure the infection 90 percent of the time. Treatment with antibiotic B costs $80.

The antibiotics work independently of one another. Both antibiotics can be safely administered to children. A health insurance company intends to recommend one of the following two plans of treatment for children with this ear infection.

- Plan I: Treat with antibiotic A first. If it is not effective, then treat with antibiotic B.
- Plan II: Treat with antibiotic B first. If it is not effective, then treat with antibiotic A.

(a) If a doctor treats a child with an ear infection using plan I, what is the probability that the child will be cured? If a doctor treats a child with an ear infection using plan II, what is the probability that the child will be cured?

(b) Compute the expected cost per child when plan I is used for treatment. Compute the expected cost per child when plan II is used for treatment.

(c) Based on the results in part (a) and (b), which plan would you recommend? Explain your recommendation.