Instructions: Answer each question, and when required explain your answer. Your explanation must be clear and complete. You may refer to your book, your notes and your homework papers.

[1] (6 points) Correct the following statements.
(a) "A recent survey showed that support for the governor's program fell 10%, from 50% to 40%.

Either say the support fell 10 percentage points or 20%. Either is acceptable (remember that 10% of 50% is (0.1)(0.5) = (0.05), or 5%, but 20% of 50% is (0.2)(0.5) = 0.1, or 10%; thus, either the support fell 10 percentage points or by 20%). Remember that percentages measure relative quantity and percentage points measure difference.
(b) "One of the symptoms of H1N1 is a fever of over 100°C." 100°C should be 100°F.

[2] (8 points) Two siblings, Eric and Alex, must divide the 10 hours of computer time available to them for the week. Seven hours are weekday hours, and the remaining 3 hours are on the weekend. Eric prefers weekday hours in a 2-to-1 ratio. Alex prefers weekend hours over weekday hours by a ratio of 3-to-1. Neither is willing to create divisions that are the same. They agree to use the divide-and-choose method for two players.
(a) How could Eric fairly divide the computer time if he were the divider? Indicate which option Alex would choose, and why.
At 2 pts/weekday hour and 1pt/weekend hour, Eric places a 17-point valuation on the system. He could divide the hours the following way: (1) 4 weekday hours and 1/2 weekend hour; (2) 3 weekday hours and 2.5 weekend hours. In this case, Alex chooses Portion (2).
(b) Do the same with Alex as the divider.
At 3 pts/weekend hour and 1pt/weekday hour, Alex places a 16-point valuation on the system. He could divide into the following two portions: (1) 2 hours during the week and 2 hours during the weekend; (2) 5 hours during the week and 1 hour during the weekend. In this case, Eric chooses Portion (2).

[3] (9 points) Judy, Cathy, and Sharon inherit four items from their grandmother's estate. The women make the following sealed bids on the items.
(a) For each item, which is the highest bidder?
Piano: Judy ($5000); Lamp: Cathy ($35); Sculpture: Judy ($400); Armoire: Cathy ($3000)
(b) How much money is placed in the compensation fund? $8435
(c) Which items go to which women? How much does each woman pay? How much monetary compensation does each woman receive?
The items go to the high bidders; see answer to problem (a). Also, only the women who get an item pay anything, so Judy pays 5000+400 = 5400 and Cathy pays 35 + 3000 = 3035. The women each receive 1/3 of the worth they place on each item (this corresponds to being "bought out" of their share of each item by the others).
Initially, then, the women get the following from the compensation fund:
Judy gets: (1/3)*(5000 + 20 + 400 + 2200) = 2540
Cathy gets: (1/3)*(3905 + 35 + 350 + 3000) = 2430
Sharon gets: (1/3)*(4500 + 11 + 275 + 2900) = 2562
This leaves 8435 - 2540 - 2430 - 2562 = 903 left in the compensation fund. This gets split evenly among the 3 of them, so they each get an additional $301, summarized in the following table:
<table>
<thead>
<tr>
<th>Person</th>
<th>Dollar value of property received</th>
<th>Cash received</th>
<th>Cash paid</th>
<th>Total Value of Inheritance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Judy</td>
<td>$5400</td>
<td>$2841</td>
<td>-$5400</td>
<td>$2841</td>
</tr>
<tr>
<td>Cathy</td>
<td>$2935</td>
<td>$2731</td>
<td>-$2935</td>
<td>$2731</td>
</tr>
<tr>
<td>Sharon</td>
<td>$0</td>
<td>$2863</td>
<td>$0</td>
<td>$2863</td>
</tr>
</tbody>
</table>

[4] (9 points) A jar contains 3 marbles: one red, one green, and one yellow. An experiment consists of drawing a marble from the jar, noting its color, placing it back in the jar, mixing, and drawing a second marble.
(a) List the outcomes in the sample space and the theoretical probabilities for each outcome in a table.

<table>
<thead>
<tr>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>RR</td>
</tr>
<tr>
<td>RG</td>
</tr>
<tr>
<td>RY</td>
</tr>
<tr>
<td>GR</td>
</tr>
<tr>
<td>GG</td>
</tr>
<tr>
<td>GY</td>
</tr>
<tr>
<td>YR</td>
</tr>
<tr>
<td>YG</td>
</tr>
<tr>
<td>YY</td>
</tr>
</tbody>
</table>

Theoretical probabilities:
- RR: 1/9
- RG: 1/9
- RY: 1/9
- GR: 1/9
- GG: 1/9
- GY: 1/9
- YR: 1/9
- YG: 1/9
- YY: 1/9
(b) Find the theoretical probability of getting at least one red marble: 5/9
(c) Find the theoretical probability of getting no red marbles: 4/9

[5] (8 points) An experiment consists of tossing a coin and then rolling two dice. How many outcomes are possible for the following? Use the Fundamental Counting principle.
(a) tossing the coin
2
(b) rolling the first die
6
(c) rolling the second die
6
(d) conducting the experiment
(2)(6)(6) = 72