Homework 2
Due date: 2/1/2002

Note: Only the problems that are boxed will be graded.
The other problems are provided for your practice.

Part I

1. In a recent survey, a statistician reported the following data:
   15 persons liked brand A.
   18 persons liked brand B.
   12 persons liked brand C.
   8 persons liked brands A and B.
   6 persons liked brands A and C.
   7 persons liked brands B and C.
   2 persons liked all three brands.
   2 persons liked none of the three brands.

When the statistician claimed to have interviewed 30 persons, he was fired. Explain why!

2. A chicken farmer surveyed his flock with the following results. The farmer has:
   9 fat red roosters
   2 fat red hens
   26 fat roosters
   37 fat chickens
   7 thin brown hens
   18 thin brown roosters
   6 thin red roosters
   5 thin red hens.

   (a) How many roosters has the farmer?
   (b) How many hens has the farmer?
   (c) How many fat chicken has the farmer?

[Hint: You need a Venn diagram with circles for fat, for male (a rooster is a male, a hen
is a female), and for red (assume that brown and red are opposites in the chicken world).]
Part II

1. If \( n(A) = 12 \), \( n(B) = 6 \), and \( n(A \cup B) = 14 \) then
\[
n(A \cap B) = \underline{\text{______}}.
\]

2. The table below shows the distribution of employees at the Taste-T Noodle Company. (Thus, for example, \( A \) represents the set of administrative employees.) Determine the number of persons in each of the following sets.

<table>
<thead>
<tr>
<th>Department*</th>
<th>( A )</th>
<th>( C )</th>
<th>( O )</th>
<th>( SK )</th>
<th>( SS )</th>
<th>( U )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing (( P ))</td>
<td>1</td>
<td>14</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Quality control (( Q ))</td>
<td>11</td>
<td>7</td>
<td>6</td>
<td>21</td>
<td>53</td>
<td>11</td>
</tr>
<tr>
<td>Sales (( S ))</td>
<td>8</td>
<td>8</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Manufacturing (( M ))</td>
<td>5</td>
<td>7</td>
<td>0</td>
<td>9</td>
<td>23</td>
<td>37</td>
</tr>
<tr>
<td>Janitorial (( J ))</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>8</td>
<td>11</td>
</tr>
</tbody>
</table>

*\( A \) Administrative  \( C \) Clerical  \( O \) Other  
  \( SK \) Skilled  \( SS \) Semiskilled  \( U \) Unskilled

(a) \( A \cap S \) has \( \underline{\text{______}} \) elements.

(b) \( S \cup P \) has \( \underline{\text{______}} \) elements.

(c) \( M \cap A' \cap SK' \) has \( \underline{\text{______}} \) elements.

(d) \( S \cap A' \cap C' \) has \( \underline{\text{______}} \) elements.

3. The number of students taking algebra (\( A \)) or chemistry (\( C \)) is shown in the diagram below. If the total number of students surveyed to obtain the data is 200 then

\[ \begin{align*}
A & \quad 70 \\
C & \quad 50 \\
\text{overlap} & \quad 30
\end{align*} \]

(a) \( n(A' \cup C) = \underline{\text{______}} \).

(b) \( n(A \cup C') = \underline{\text{______}} \).
4. A number of people were interviewed to find out who buys products $A$, $B$, and $C$ regularly. The results are shown in the diagram below.

(a) □ buy product $A$.

(b) □ buy product $A$ but not $B$.

(c) □ do not buy product $C$.

(d) □ buy product $B$ or $C$, but not $A$.

(e) □ people were interviewed.

5. A survey of 900 workers in a plant indicated that 500 owned houses, 600 owned cars, 345 owned boats, 300 owned cars and houses, 250 owned houses and boats, 270 owned cars and boats, and 200 owned all three.

(a) □ workers did not own any of the three items.

(b) □ workers owned only two of the items.

6. An overwhelming majority of us (91%) write our return address on the front left corner of an envelope ($L$), avoiding the back flap ($B$) as if it were a uranium mine. Just 7% of letter writers put the return address on the back flip (which does not mean that they do not put it also on the front left corner), and 2% do it either way. What percent of the people do not write a return address on their envelopes? □%