1. A. Make a VENN diagram of the following Chart showing what classes each student was enrolled in this semester.

<table>
<thead>
<tr>
<th>Name</th>
<th>Math</th>
<th>Language Arts</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashley</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Betsy</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Chris</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Devonte</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Eder</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Frank</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>George</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Heather</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isabella</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jessica</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Krista</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. \( \text{LA} \):
\[ \{B, C, D, H, J \} \]

C. \( \text{Math} \cap \text{Science} \):
\[ \{A, C, E\} \]

D. \( \text{Math}' \):
\[ \{B, F, G, H, J\} \]

E. \( \text{Math} \cup \text{LA} \):
\[ \{A, B, C, D, E, H, I, J, K\} \]

F. \( \text{Math} \cup \text{LA}' \):
\[ \{F, G\} \]

G. \( \text{Math} \cap \text{LA}' \):
\[ \{A, E, I, K\} \]

H. \( \text{Math} \cap \text{LA} \cap \text{Science} \):
\[ \{C, B\} \]

I. \( \text{Math} \cup \text{LA} \cap \text{Science} \):
\[ \{A, B, C, D, E\} \]

J. \( \text{Math} \cap \text{LA} \cup \text{Science} \):
\[ \{A, B, C, D, E, G\} \]
2. Given \( A = \{1, 2, 3, 6, 7, 9\} \), \( B = \{2, 4, 6, 7, 8\} \), and \( \Omega = \{1, 2, 3, 4, 5, 6, 7, 8, 9\} \) answer the following.

A. \( (A \cap B): \) \[ \begin{bmatrix} 2, 6, 7 \end{bmatrix} \]

B. \( (A \cup B): \) \[ \begin{bmatrix} 1, 2, 3, 4, 6, 7, 8, 9 \end{bmatrix} \)

C. \( (A)' : \) \[ \begin{bmatrix} 4, 5, 8, 9 \end{bmatrix} \]

D. \( (A \cap B)' : \) \( \begin{bmatrix} 3, 4, 5, 8, 9 \end{bmatrix} \)

3. A manager that owns 3 local area Car Maintenance Garages was researching certifications of mechanics that worked for her company. Consider the following Venn diagram.

a. How many mechanics worked for her company?
\[ 4+1+3+2+2+0+3+3 = 18 \]

b. How many of the mechanics are certified by ASE to do work on Brakes?
\[ 4+1+2+2 = 9 \]

c. How many of the mechanics are certified by ASE to do work on Brakes and Tune-Ups \((Brakes \cap Tune-Ups)\)?
\[ \text{Overlap} \ 2+2 = 4 \]

d. How many of the mechanics are certified by ASE to do work on either A/C or Tune-Ups \((A/C \cup Tune-Ups))??
\[ \text{Combine} \ 1+3+2+2+0+3 = 11 \]

e. How many of the mechanics have their certification in Brakes or A/C but not in Tune-Ups?? \((Brakes \cup A/C) \cap (Tune-Ups)')
\[ 4+1+3 = 8 \]

4. The following Venn diagram shows a breakdown of a small high school's sports program.

a. How many students play only Tennis?
\[ 14 \]

b. How many students play basketball and tennis?
\[ 3+2 = 5 \]

c. How many students play basketball or softball/baseball? \(Basketball \cup Baseball/Softball\)
\[ 12+8+20+2+3+2 = 47 \]

d. How many students play baseball/softball or tennis but not basketball? \((Baseball/Softball \cup Tennis) \cap (Basketball)'\)
\[ 12+2+14 = 38 \]

e. How many students that play a sport do not play basketball?
\[ 12+2+14 = 28 \]

f. How many students attend this school?
\[ 12+8+20+2+3+2+14+552 = 613 \]

g. How many students do not play tennis in total?
\[ 613 - [14+2+3+2] \]
5. In the state of Oregon, all of the area codes start with a number greater than 4 and end in an odd number (e.g. 503-232-1235, 971-923-5648). Let A represent the set of all area codes that start with an even number. Let B represent the set of all area codes that could be used in Oregon by the requirements stated earlier.

Which might be an area code that belongs to the set \((A \cap B)\)?

- A. 403 (Too small)
- B. 792 (Not even)
- C. 892 (OK even)
- D. 631 (OK odd)

Which might be an area code that belongs to the set \((A \cap B')\)?

- A. 403 (First even, first \(\leq 4\), last even)
- B. 792 (Not even)
- C. 892 (Not 4 or less)
- D. 631 (Not 4 or less)

Which might be an area code that belongs to the set \((A' \cap B)\)?

A. 403 (Start odd)

6. In a particular state, the first character on a license plate is always a letter. The last character is always a digit from 0 to 9. Let \(V\) represents the set of all license plates beginning with a vowel, and \(O\) represents the set of all license plates that end with an odd number.

Which might be a license plate that belongs to the set \((V \cap O)\)?

- A. E23 PC8 (Begin with vowel)
- B. MG4 3F5 (End with odd)
- C. AR8 8X9 (Begin with consonant)
- D. P7M Z5G (Begin with consonant)

Which might be a license plate that belongs to the set \((V \cap O')\)?

- A. E23 PC8 (End even)
- B. MG4 3F5 (End odd)
- C. AR8 8X9 (End even)
- D. P7M Z5G (End even)

Which might be a license plate that belongs to the set \((V' \cap O)\)?

- A. E23 PC8 (End even)
- B. MG4 3F5 (End odd)
- C. AR8 8X9 (End even)
- D. P7M Z5G (End even)