Name: _____   Date: _____

Directions: Show all work on a **_separate_** sheet of paper.

1. A and B are two sets and the number of elements in each set is shown in the Venn diagram. Given that $n(A) = n(B)$, calculate,
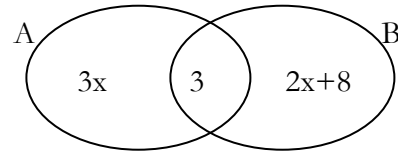
   a. The value of x

   b. $n(A \cup B)$ and $n\left(A \cap \overline{B}\right)$

   A: 3x   3   2x+8 : B

2. $U = \{p,q,r,s,t,u,v,w\}$, $A = \{p,q,r,s\}$, $B = \{r,s,t\}$, and $C = \{s,t,u,v,w\}$

   a. List the elements of $A \cap B$, $B \cap C$, $C \cap A$, and draw a Venn diagram.

   b. List the elements of $A \cap B \cap C$.

3. Given that $U = \{1,2,...,9\}$, $A = \{x : x$ is a multiple of $2\}$, $B = \{x : x$ is a multiple of $3\}$, and $C = \{x : x$ is odd $\}$. By drawing a Venn diagram, list the elements of the following sets.

   a. $A \cup B$ and $A \cup B \cup C$

   b. $B \cup C$ and $\overline{B \cup C}$

4. There are 35 pupils in a Pre-Calculus with Trigonometry class. Of these, 22 students will take Calc H next year, 19 students will take AP stat, and 5 students will not take a math. How many students will take both AP Stat and Calc H next year?

5. A survey was given to 75 students at RHS. 16 had Facebook, Twitter and Instagram. 24 had Twitter and Facebook. 30 had Instagram and Twitter. 22 had Instagram and Facebook. 7 students only had Facebook, 10 students only had Twitter and 5 only had Instagram. How many had neither facebook, twitter or instagram? Make a Venn Diagram for the situation.

6. Use Venn Diagrams to show that the following is true.

$$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$$

7. Of 100 customers at Renatos Pizza, 60 ordered cheese and pepperoni on their pizza. All together, 80 customers ordered a pizza with cheeze on it, and 72 ordered a pizza with pepperoni on it.

   a) How many customers ordered cheese on their pizza, but no pepperoni?

   b) How many customers ordered pepperoni on their pizza, but no cheese?

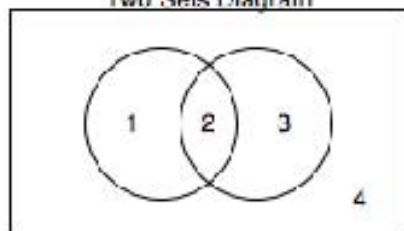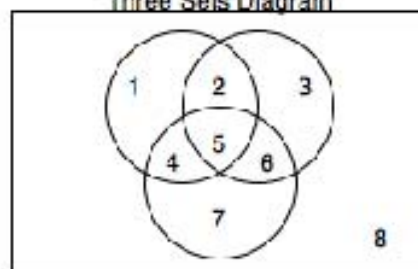   c) How many customers in the group of 100 customers did not order eitehr type of pizza?

Practice Identifying Regions

Use Venn diagrams to illustrate the following. Use shading to show your work and list the regions that represent your final answer according to the diagrams below.

Two Sets Diagram

Three Sets Diagram

a. $\overline{A \cup B}$

b. $\overline{A} \cup B$

c. $\overline{A} \cap \overline{B}$

d. $A \cup (B \cup C)$

e. $(A \cap B) \cup C$

f. $(A \cap \overline{B}) \cup C$

g. $(\overline{C} \cup \overline{A}) \cap B$

h. $(A \cup B) \cap (A \cup C)$