Name _____ Date _____

Day 2 – Set Notation and Venn Diagrams

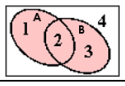
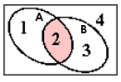
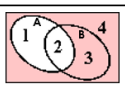
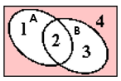
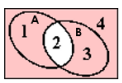
We will use **Venn Diagrams** to help us visualize the probabilities that we discuss for the unit. Before we can visualize probabilities this way, we must discuss set notation.

The **intersection** of two or more events is all the outcomes shared by both events and is denoted with the word "and" or the symbol $\cap$.

The **union** of two more events is all the possible outcomes for either events and is denoted with the word "or" or the symbol $\cup$.

The **complement** of an event is the set of outcomes in the sample space that are not included in the outcomes of the event and is denoted with the word "not" or with the ' symbol.

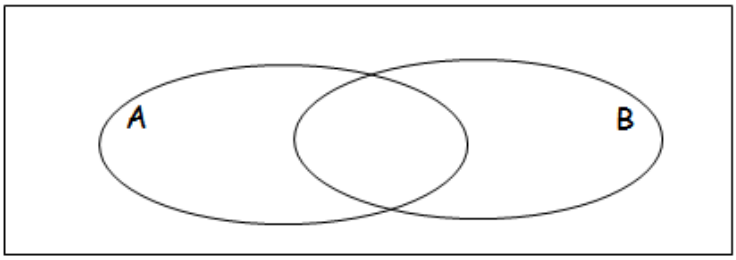
SET NOTATION SUMMARY:

Set Notation	Pronunciation	Meaning	Venn Diagram	Answer
$A \cup B$	"A union B"	Everything in both sets; to unite; Used in OR problems		$\{1, 2, 3\}$
$A \cap B$	"A intersect B"	Only what is in common with both sets; Used in AND problems		$\{2\}$
$\overline{A}$ or A'	"A complement"	Everything NOT in set A		$\{3, 4\}$
$(A \cup B)'$	"not A union B"	Everything NOT in set A and set B		$\{4\}$
$(A \cap B)'$	" not A intersect B"	Everything NOT in common between set A and set B		$\{1, 3, 4\}$

Example 1: Using results from our class, create a Venn Diagram and find the probabilities listed below:

Let A = Students taking a Science class

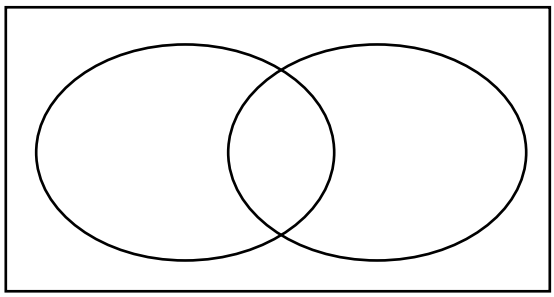
Let B = Students taking an English class



a. P(A) b. P(A)' c. P(B) d. P(B)'

e. P(A $\cap$ B) f. P(A $\cap$ B)' g. P(A $\cup$ B) h. P(A $\cup$ B)'

Example 2: We randomly selected 100 juniors enrolled in Pre-Calculus at HHS. Of those 100 students, 55 are taking AP Calculus, 35 are taking AP Stats, and 10 are taking both courses. Construct a Venn Diagram and answer the questions:

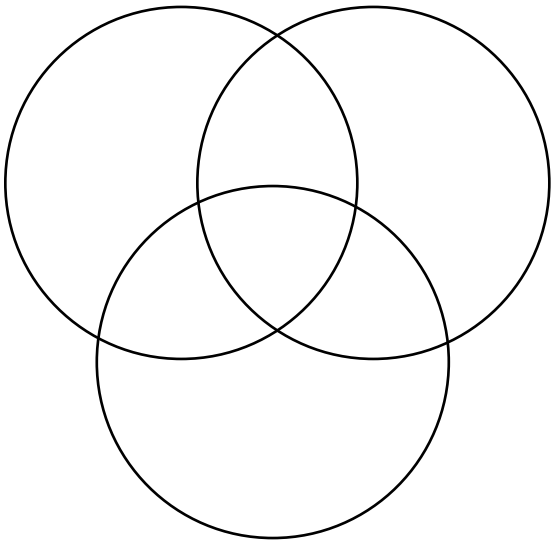


2. Find the following probabilities:

a. P(Calc or Stats)

b. P(Not Calc or Not Stats)

Example 3: Each member of a sports club plays at least one sport: soccer, rugby, or tennis. The following is known: 43 members play tennis, 11 play tennis and rugby, 7 play tennis and soccer, 6 play soccer and rugby, 84 play rugby or tennis, 68 play soccer or rugby, and 4 play all three sports. Create a Venn Diagram to represent the members and the sports they play.



1. How many members are there total?

2. Find the following probabilities:

$P(R \cup T)$ $P(T)'$