

End of Semester Schedule

EOC Monday/Tuesday 5/7 and 5/8

Unit 7 Probability Test * Friday 5/11

Final Tuesday/Wednesday 5/22 and
5/23

Probability Terminology and Notation

In probability, a **sample space** is the set of all possible outcomes. Any subset from the sample space is an **event**.

Example:

- a. *Sample Space*: all the playing cards in a 52 card deck
- b. *Event*: drawing a queen of hearts *Event*: drawing a club
Event: Drawing a Ace of Spades

A **single event** is an event that describes a single outcome.

Example:

- a. Flipping a coin and landing on heads
- b. Rolling a 3 with a die

A **compound event** combines two or more events using the word **and** or the word **or**.

Example:

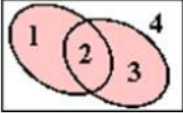
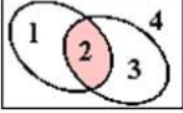
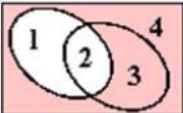
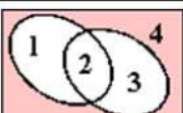
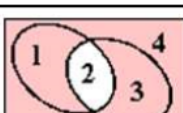
- a. Rolling a die two times
- b. Flipping a coin four times.

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.

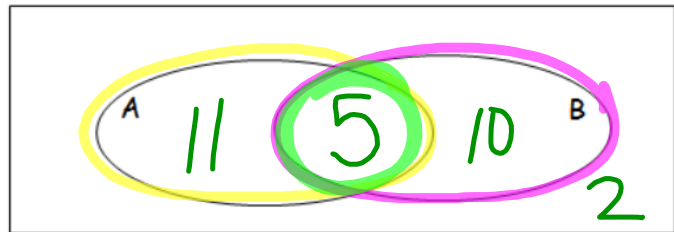
We will use **Venn Diagrams** to help us visualize the probabilities that we discuss for the unit.

Set Notation	Pronunciation	Meaning	Venn Diagram	Answer
$A \cup B$	"A union B"	Everything in both sets		$\{1, 2, 3\}$
$A \cap B$	"A intersect B"	Only what is in common with both sets		$\{2\}$
\bar{A} or A'	"A complement" "Not A"	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



$$\text{Probability} = \frac{\text{Want}}{\text{have}} = \frac{\text{Possible}}{\text{total}}$$

a. $P(A)$

$$\frac{16}{28}$$

b. $P(A)'$

$$\frac{12}{28}$$

c. $P(B)$

$$\frac{15}{28}$$

d. $P(B)'$

$$\frac{13}{28}$$

e. $P(A \cap B)$

$$\frac{5}{28}$$

f. $P(A \cap B)'$

$$\frac{23}{28}$$

g. $P(A \cup B)$

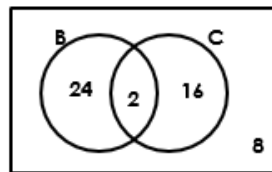
$$\frac{26}{28}$$

h. $P(A \cup B)'$

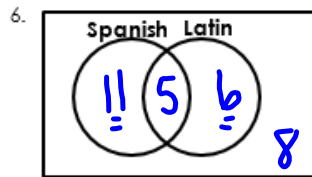
$$\frac{2}{28}$$

If the Venn Diagram below shows the number of people in a fine arts club who are in band (B) and choir (C), make the following determinates:

- $\frac{26}{50}$ 42 1. How many people are in the club?
- $\frac{13}{25}$ 2. Find $P(B)$
- $\frac{1}{25}$ 3. Find $P(B \cap C)$ $\frac{2}{50}$
- $\frac{27}{25}$ 4. Find $P(B \cup C)$ $\frac{42}{50}$
- $\frac{12}{25}$ 5. Find $P(B)'$ $\frac{24}{50}$



A guidance counselor is planning schedules for 30 students. 16 want to take Spanish and 11 want to take Latin. 5 say they want to take both. Display this information on the Venn Diagram below.



- $\frac{5}{30}$ $\frac{1}{6}$ 7. Find $P(S \cap L)$
- $\frac{11}{30}$ $\frac{11}{30}$ 8. Find $P(L)$
- $\frac{22}{30}$ $\frac{11}{15}$ 9. What is the probability that a student studies at least one subject? $P(S \cup L)$
- $\frac{8}{30}$ $\frac{17}{30}$ 10. What is the probability that a student studies exactly one subject?
- $\frac{5}{30}$ $\frac{4}{15}$ 11. What is the probability that a student studies neither subject? $P(S \cup L)'$
- $\frac{1}{6}$ 12. What is the probability that a student studied Spanish if it is known that the student studies Latin?

Mr. Leary's Class: Use the Venn Diagram showing the number of kids owning bicycles (A) and skateboards (B) to find the following probabilities.

_____ 13. Find $P(A \cap B)$ and describe what this probability represents?

AND

_____ 14. Find $P(A \cup B)$ and describe what this probability represents?

OR

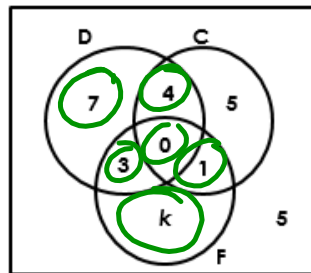
_____ 15. Find $P(A \cup B)'$ and describe what this probability represents?



The Venn Diagram below shows the results of a survey done by a veterinarian about the types of pets owned by 26 clients. The survey was only related to dogs (D), cats (C), and fish (F).

_____ 16. What is the value of k?

17. How did you determine the value?



If a randomly selected member is asked their preference, what is the probability that the member has:

- $\frac{7}{26}$ 18. Only dogs?
- $\frac{2}{13}$ 19. Dogs and cats? $\frac{4}{26}$
- $\frac{5}{26}$ 20. None of these animals?
- $\frac{21}{26}$ 21. At least one of these pets?
- 0 22. All of the pets?
- $\frac{3}{26}$ 23. Fish and dogs, but not cats?
- $\frac{8}{13}$ 24. Fish or dogs? $\frac{16}{26}$