

Date:

Section:

Objective:

Sample Space: The set of all possible outcomes for a chance process.

Event/Subset: An outcome or set of outcomes from the sample space.

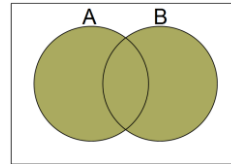
Complement (A^c): “Not”

- All outcomes in the sample space that are not part of the event.

Chance Process	Sample Space	Event/Subset	Complement
Flip a coin	$S = \{\text{heads, tails}\}$	$B = \{\text{heads}\}$	$B^c = \{\text{tails}\}$
Roll a die	$S = \{1, 2, 3, 4, 5, 6\}$	even numbers $E = \{2, 4, 6\}$	$E^c = \{1, 3, 5\}$
Pick a letter in the word “probability”	$S = \{P, R, O, B, A, I, L, T, Y\}$	vowels $V = \{O, A, I, Y\}$	$V^c = \{P, R, B, L, T\}$

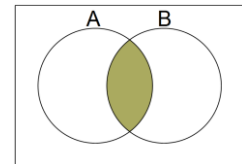
Union ($A \cup B$): “Or”, “Either”

- All of the elements that are in A or B or both.

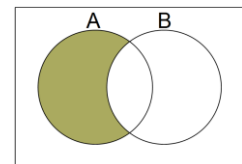


Intersection ($A \cap B$): “And”, “Both”, “Overlap”, “In common”

- All of the elements that are in *both* A and B .
- If the two sets don’t have anything in common, the intersection is the “empty set”, indicated by \emptyset or $\{ \}$.

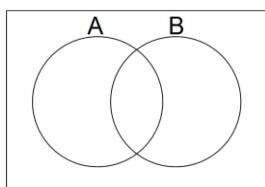


Note: If you want to write “everything in A that isn’t in B ,” you can write either $A \cap B^c$ or $A - B$.

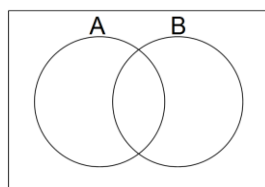


Examples: Shade the appropriate portion of the Venn diagram.

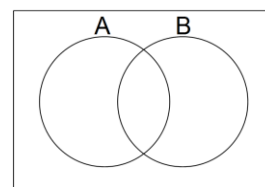
1. A^c



2. $(A \cap B)^c$



3. $B - A$



Examples:

- Chance Process: Rolling a 10-sided die.
 - Event A: Rolling an odd number
 - Event B: Rolling a prime number
- a. What is the sample space?
- b. List the outcomes in each event.
- c. Draw a Venn diagram representing the sample space with subsets A and B.
- d. List all the outcomes in $A \cup B$.
- e. List all the outcomes in $A \cap B$.
- f. List all the outcomes in A^c .
- g. List all the outcomes in $(A \cup B)^c$.
- h. List all the outcomes in $A - B$.
- Chance Process: Reaching into a messy refrigerator and grabbing a food at random.
- Sample Space: $S = \{\text{broccoli, carrots, moldy cheese, milk, orange, lettuce, lime jello, bologna, egg, corn, celery}\}$
 - Event A: Picking a vegetable
 - Event B: Picking something green
- a. List the outcomes in each event.
- b. Draw a Venn diagram representing the sample space with subsets A and B.

- c. List all the outcomes in $A \cup B$.
- d. List all the outcomes in $A \cap B$.
- e. List all the outcomes in B^c .
- f. List all the outcomes in $(A \cap B)^c$.
- g. List all the outcomes in $B - A$.

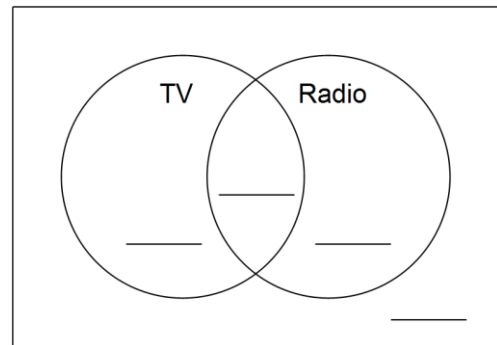
Examples:

A political ad was run on TV and on radio.

- 33% of people saw it on TV.
- 21% heard it on the radio.
- 10% of people both saw it on TV and heard it on the radio.

Determine what percent:

- a) only saw it
- b) only heard it
- c) neither heard it or saw it
- d) did not see it



A sample of 60 people are asked if they enjoy watching basketball and if they enjoy watching football.

- 25 people say they enjoy watching football
- 40 people say they enjoy watching basketball
- 15 people say they enjoy watching both

Determine how many people:

- a) enjoy football but not basketball
- b) enjoy basketball but not football
- c) don't enjoy either basketball or football
- d) don't like football

