

Chapter 7.3: Union and Intersection

In addition to being concerned with how one event might affect another, it is also useful to be able to calculate the likelihood of two events happening at the same time, or the likelihood of satisfying at least one of a set of conditions.

For example: Pretend you are cruising match.com for a potential date and you are choosing attributes in a partner that are important.

E =

F =

It could be useful to investigate the set of people that are

E AND F, or if you're willing to settle, **E OR F**.

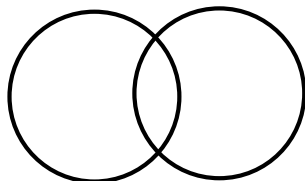
Synonyms and Notation

- AND

- \cap

- INTERSECTION

- BOTH AT THE
SAME TIME

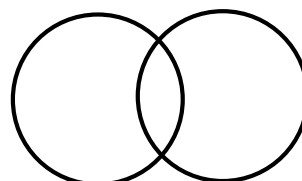


- OR

- \cup

- UNION

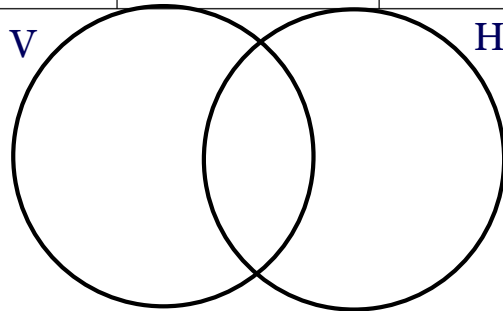
- ONE OR THE
OTHER,
OR BOTH





Consider the students from an advisory group (from an earlier problem set)

ADVISORY ROSTER	PICKED FOR VARISTY SPORT	PICKED FOR HONOR ROLL
ADAM	ADAM	ANNA
ANNA	ANNA	KIM
CELESTE	CELEST	THOMAS
KIM	KIM	
LUCIA	MIGUEL	
MIGUEL	MING	
MING		
SEBASTIAN		
SYLVIA		
THOMAS		



AND

$$RF(V \cap H) =$$



Consider the relative frequency two way table that displays students who consider themselves short or not short and report that they have been bullied or not bullied.

	Ever Bullied		
Height	Yes	No	Total
Short	0.20	0.24	0.44
Not Short	0.14	0.42	0.56
Total	0.34	0.66	1

What does 0.34 represent in the table?

What does 0.44 represent in the table?

What does 0.20 represent in the table?



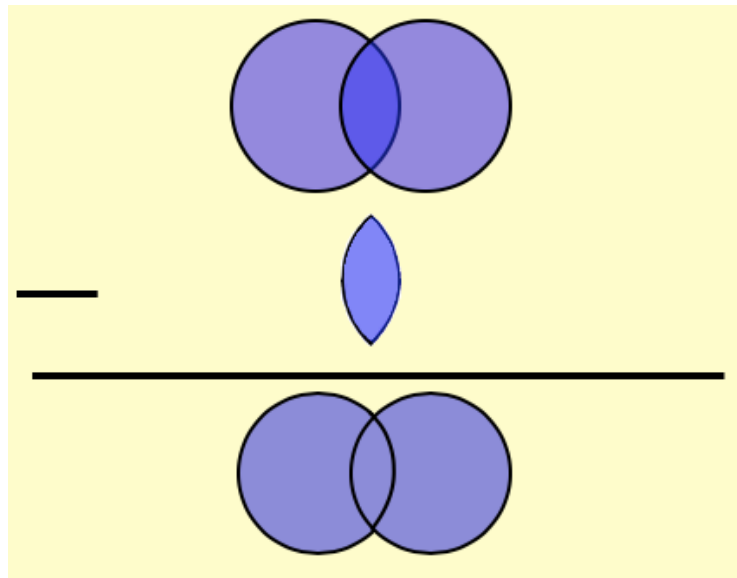
OR

$$RF(S \cup B) =$$



Visually Speaking:

OR



Sometimes it is easier to consider the **complement**.

We found that

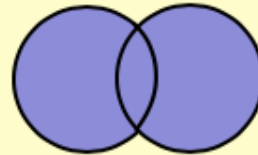
$RF(S \cup B)$ is

_____.

	Ever Bullied		
Height	Yes	No	Total
Short	0.20	0.24	0.44
Not Short	0.14	0.42	0.56
Total	0.34	0.66	1

What is the complement of "Short OR Bullied"?

If two sets together cover all possible outcomes (and there is no overlap):



then they are called complements of each other

	Ever Bullied		
Height	Yes	No	Total
Short	.20	.24	.44
Not Short	.14	.42	.56
Total	.34	.66	1

$RF(\text{not short and not bullied}) + RF(\text{short or bullied}) = \underline{\hspace{2cm}}$



Summary Of AND/OR Rules

$$\text{AND}$$
$$P(A \cap B) =$$

$$\text{OR}$$
$$P(A \cup B) =$$



The Complement Rule



Classwork/Homework Assignment

Problem Set 7.3