

## Bellwork: Student Survey

- 1 • Were you aware of the GVC (big ideas) for this course/class?
- 2 • Was the GVC (big ideas) taught and assessed?
- 3 • Were you supported as you learned the GVC (big ideas)?

## Lesson 7.1 Objectives

I can use Venn Diagrams with probability and sets

Suppose a student conducted a dental hygiene survey among 8 of her friends. Each friend filled out a survey card. An example response is below.

Name: Rob

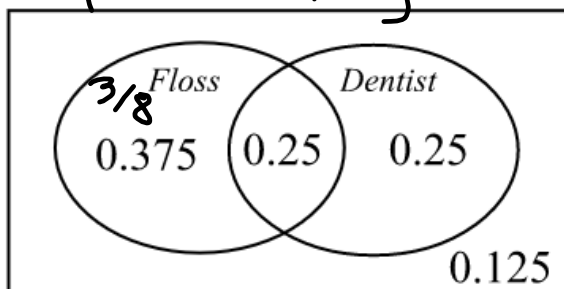
Do you floss every day?    Y     N

Do you visit the dentist  
at least once a year?    Y     N

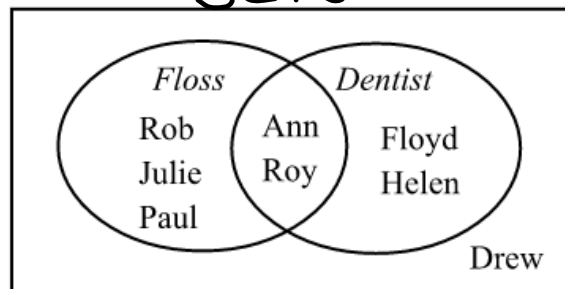
## Venn Diagrams

The student used Venn Diagrams to organize the results of her survey. Discuss the differences in the three versions of Venn Diagrams

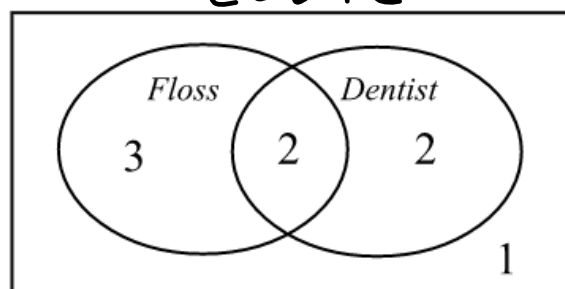
*probability*







*sets*



*count*



# Definitions (What these weird symbols mean)

- OR  
 $P(A \cup B)$  probability that events  $A$  or  $B$  (or both) occur. 
- AND  
 $P(A \cap B)$  probability that events  $A$  and  $B$  both occur (together or simultaneously). 
- GIVEN  
 $P(A|B)$  probability that event  $A$  occurs, given that event  $B$  has already occurred. 
- NOT  
 $P(A^c)$  probability that event  $A$  does not occur. (the complement of  $A$ ) 

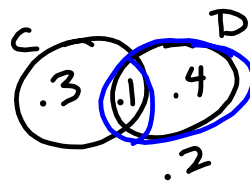
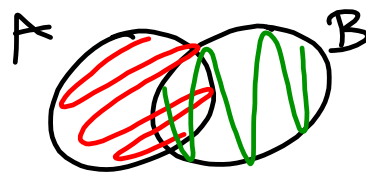
## Formulas

$$P(A \cup B) = \underline{P(A)} + \underline{P(B)} - P(A \cap B)$$

$$P(\underline{A|B}) = \frac{P(A \cap B)}{\underline{P(B)}}$$

$$P(A^c) = 1 - P(A) \quad 1 - .30 = .70$$

$$1 - .40 = .60$$



$$P(C|D) = \frac{.1}{.5} = .2$$

## Example 1

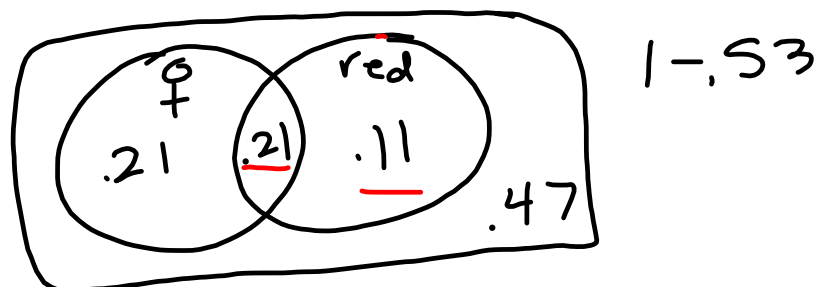
Use the dental hygiene survey above to answer the following.

- A) Name the friends who don't floss every day. *Drew, Floyd, Helen*  
 B) How many friends floss every day and visit the dentist at least once a year? *2*  
 C) What proportion of friends visit the dentist at least once a year?

$$\frac{1}{2}, .50$$

## Example 2

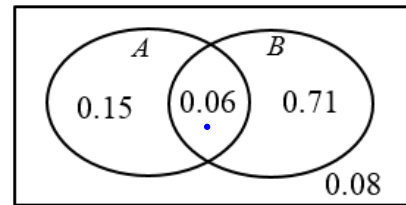
A local police department collected data on what types of vehicles and people received speeding tickets. 42% of tickets were given to females, 32% were issued to red cars, and 21% were given to females in red cars. Create a Venn Diagram to model this data.



## Example 3

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A|B) = \frac{P(A \cap B)}{P(B)} \quad P(A^c) = 1 - P(A)$$



Use the Venn Diagram at the right to find each probability.

A)  $P(A)$   $.15 + .06 = .21$

E)  $P(A|B)$   $.06 / .77 = .078$

B)  $P(B)$   $.06 + .71 = .77$

F)  $P(B|A)$   $P(A \cap B) / P(A) = \frac{.06}{.21}$

C)  $P(A \cup B)$   $.15 + .06 + .71$

G)  $P(A^c)$   $1 - P(A) = .79$

D)  $P(A \cap B)$   $.06 = .92$

H)  $P(B^c)$   $1 - .77 = .23$

$.21 + .77 - .06 = .92$

$1 - .77 = .23$