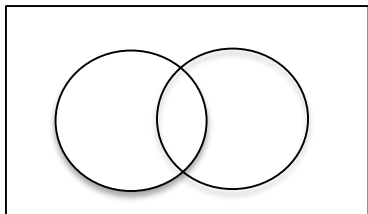


## CHAPTER 14: PROBABILITY RULES!

### Vocab List

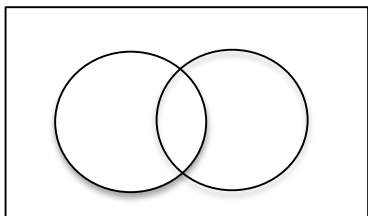
- Conditional Probability
- General Addition Rule
- General Multiplication Rule
- Independence (used formally)
- Tree Diagram

General Addition Rule: Use when things are \_\_\_\_\_



Conditional Probability: The probability of B, given A

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



Independence (used formally): Events A and B are independent whenever \_\_\_\_\_

General Multiplication Rule:

1. Determine the probability for each event given a standard deck of cards with no jokers.
  - a. One card is drawn, what is the probability it is an ace or red?
  - b. Two cards are drawn without replacement. What is the probability they are both aces?
  - c. Five cards are drawn without replacement. What is the probability they will all be hearts?
  - d. You draw one card and look at it. You tell your neighbor that it is red. What is the probability it is a heart? And what is the probability it is red, given it is a heart?
  - e. Are “red card” and “spade” independent? Mutually exclusive?
  - f. Are “face card” and “king” independent? Mutually exclusive?
  
2. In a recent survey, 56% of 5<sup>th</sup> graders said they preferred vanilla ice cream, 58% prefer chocolate, and 26% like both flavor equally.
  - a. Draw a Venn diagram that represents 5<sup>th</sup> graders ice cream preference.
  - b. What percent of 5<sup>th</sup> graders don't like Vanilla or Chocolate?
  - c. What percent of 5<sup>th</sup> graders only like Chocolate?
  
3. Create a 2-way table to show how many males and females are wearing jeans today.
  - a. What is the probability that a male wears jeans?
  - b. What is the probability that someone wearing jeans is male?
  - c. Are being male and wearing jeans disjoint?
  - d. Are sex and attire independent?
  
4. In April 2003, *Science* magazine reported on a new computer-based test for ovarian cancer, “clinical proteomics,” that examines a blood sample for the presence of certain patterns of proteins. Ovarian cancer, though dangerous, is very rare, afflicting only 1 of every 5000 women. The test is highly sensitive, able to correctly detect the presence of ovarian cancer in 99.97% of women who have the disease. However, it is unlikely to be used as a screening test in the general population because the test gave false positives 5% of the time. Draw a tree diagram to answer the questions below.
  - a. What percent of women with Ovarian Cancer test negative?
  - b. What percent of women with without Ovarian Cancer test positive?
  - c. What percent of the women who test positive actually have Ovarian Cancer?