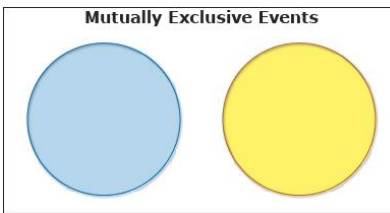# Mutually Exclusive Events NOTES
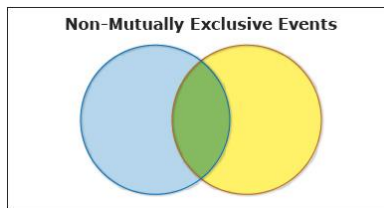
Mutually Exclusive events: Events that cannot happen at the same time

$$P(A \text{ or } B) = P(A) + P(B)$$

Inclusive events: Events that can happen at the same time

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

Example: You choose a puppy at random from a little of 2 brown males, 1 brown female, 1 black male, and 1 black female.

- P(female or brown)
- P(female or male)

Example: Determine if each are mutually exclusive or inclusive and write the formula.

1. Students are forming 4 softball teams by each picking one of four different color cards from a bag: Red, White, Blue, Yellow.
    - P(Red or Yellow)

2. Choosing cards from a standard 52 deck of cards.

    - P(hearts or red card)
    - P(diamonds or clubs)

3. Rolling a six sided number cube.

    - P(2 or 5)
    - P(2 or even number)

Example: Determine if each are mutually exclusive or inclusive and find each probability.

1. Apples are in 1/4 of all the lunch bags at a school picnic and bananas are in 1/3 of the bags.
   - P(apple or banana)

2. 47% of the people who ordered food at an Italian deli on Friday ordered pizza. 37 % used a credit card. 20% ordered pizza and payed with a credit card.
   - P(pizza or credit card)

3. A group of senior citizens have won free vacation packages. They can choose one of three vacations. The vacation to Bermuda is chosen by 25%, 60% choose Alaska, and 15% choose Costa Rica.
   - P(Costa Rica or Bermuda)

For each scenario, write **mutually exclusive** or **inclusive.**

1) A spinner has an equal chance of landing on each of its eight numbered regions. After spinning, it lands in region three or six.

2) A bag contains six yellow jerseys numbered one to six. The bag also contains four purple jerseys numbered one to four. You randomly pick a jersey. It is purple or has a number greater than five.

3) A magazine contains twelve pages. You open to a random page. The page number is eight or ten.

4) A box of chocolates contains six milk chocolates and four dark chocolates. Two of the milk chocolates and three of the dark chocolates have peanuts inside. You randomly select and eat a chocoate. It is a milk chocolate or has no peanuts inside.

5) A magazine contains fourteen pages. You open to a random page. The page number is three or seven.

6) A basket contains three apples, three peaches, and four pears. You randomly select a piece of fruit. It is an apple or a peach.