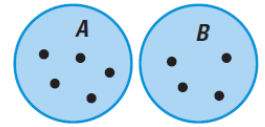


### Compound Events:

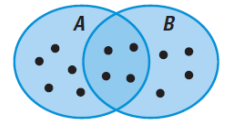
- Two or more events put together to make ONE event – the union or intersection of two events
- You will see the word “OR” – “OR” means to \_\_\_\_\_ probabilities together.

### Probability of Compound Events:

- **Disjoint Events:** events cannot happen at the same time
  - Add probabilities together:
    - $P(A \text{ or } B) = P(A) + P(B)$
  - Example: Choosing a 3 or a face card
    - There are no 3's that are face cards so these two events cannot happen at the same time



- **Overlapping Events:** events can happen at the same time
  - Add probabilities together and subtract the intersection (overlap)
    - $P(A \text{ or } B) = P(A) + P(B) - P(\text{overlap})$
  - Example: Choosing a black or a 3
    - There are black 3's in a deck of cards so these two events can happen at the same time

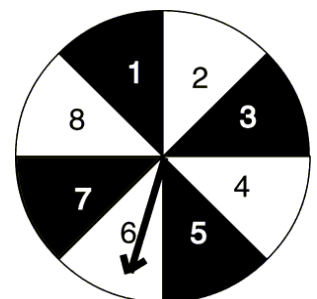


### Examples:

- 1) There are 7 red, 8 green, and 6 blue marbles in bag. Kate is going to select one marble at random. What is the probability that she will select a green or blue marble?
- 2) A card is randomly selected from a deck of 52 cards. What is the probability that the card is a “10” or a “face card”?
- 3) You roll a fair die. What is the probability that you roll a “1” or an even number?
- 4) In Ms. Carr’s Math class, 9 of the 14 girls said they “like math”, and 7 of the 16 boys said they “like math”. If Ms. Carr randomly selects a student, what is the probability that she chooses a girl or someone who likes math?
- 5) A card is randomly selected from a deck of 52 cards. What is the probability that the card is a “face card” or a “red”?
- 6) You roll a fair die. What is the probability that you roll a “4” or an even number?

### Use the spinner for questions #7–11: What is the probability of landing on...

- 7) a black space or an odd?
- 8) a multiple of 3 or a white space?
- 9) an odd or a 4?
- 10) a black 6?
- 11) a factor of 6 or a prime?



Now you will see the word “AND” because you are finding the probability of MORE THAN ONE event.  
When there is more than one event occurring, you \_\_\_\_\_ the probabilities together.

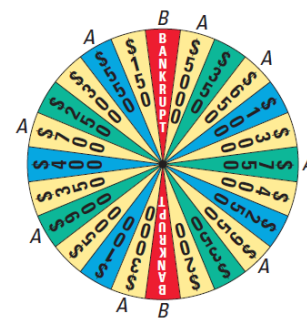
### **Probabilities of More than One Event: $P(A \text{ and } B) = P(A) \cdot P(B)$**

- **Independent Events:**
  - Events are not related
  - **With replacement:** whatever is picked is put back before second pick
    - Denominator stays the same
- **Dependent Events:**
  - Events are related
  - **Without replacement:** whatever is picked is NOT put back before second pick
    - Denominator decreases by one
- How many fractions should I multiply?
  - You should multiply the same number of fractions as the number of objects you are choosing

### **Examples: Order is Specified**

- 1) Out of a class of 20 students, your teacher chooses students at random to present their projects. What is the probability that she chooses you first, and then chooses Kim second?
  
  
  
  
  
  
  
  
  
  
- 2) You flip a fair coin. What is the probability that it shows heads on the first flip and shows tails on the second flip?
  
  
  
  
  
  
  
  
  
  
- 3) Tom has 4 navy socks and 6 black socks in a drawer. One dark morning, he randomly pulls out 2 socks. What is the probability that he will select a pair of navy socks?
  
  
  
  
  
  
  
  
  
  
- 4) There are 2 glasses of root beer and 4 glasses of cola on the counter. Dave drinks two of them at random. What is the probability that he drank 2 glasses of cola?
  
  
  
  
  
  
  
  
  
  
- 5) Steve reaches into a bag with 5 red marbles, 3 yellow marbles, and 2 green marbles, and randomly selects one. Then, he puts the marble back, and Sam reaches into the same bag and randomly selects a marble. What is the probability that both guys selected a yellow marble?
  
  
  
  
  
  
  
  
  
  
- 6) A bowl contains 4 tangerines and 5 clementines. John randomly selects one piece of fruit, and then Pam randomly selects one of the remaining pieces of fruit. What is the probability that John selects a tangerine and Pam selects a clementine?

- 8) You are playing a game that involves spinning the money wheel shown. During your turn, you get to spin the wheel twice. What is the probability that you get more than \$500 on your first spin and then go bankrupt on your second spin?



- 11) There are 6 pennies, 9 nickels, and 3 dimes in a box. Find the probability of...
  - a)  $P(2 \text{ nickels})$ —without replacement:
  - b)  $P(1 \text{ nickel and then a dime})$ —with replacement:
  - c)  $P(1 \text{ nickel and then 1 dime})$ —without replacement:
  - d)  $P(1 \text{ penny and then 2 nickels})$ —without replacement:
- 12) From a standard deck of cards, what is the probability of choosing...
  - a) a red and then a club with replacement?
  - b) a 3, then a 7, then a face card w/o replacement?
  - b) a diamond, then a heart, then a black card w/o replacement?
  - d) a number card and then a face card with replacement?

