

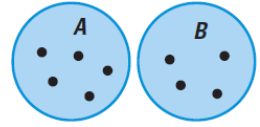
10.7 Probability of Compound Events

Compound Events:

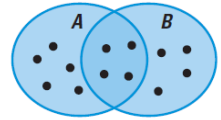
- Two or more events put together to make ONE event – the union or intersection of two events
- You will see the word “OR” – “OR” means to _____ probabilities together.

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

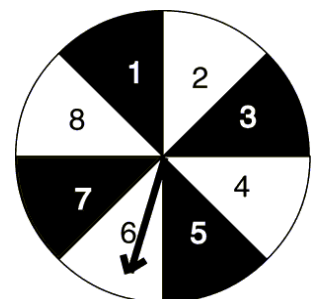


Examples:

- 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?



10.8 Probability of Independent and Dependent Events

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: $P(A \text{ and } B) = P(A) \cdot P(B)$

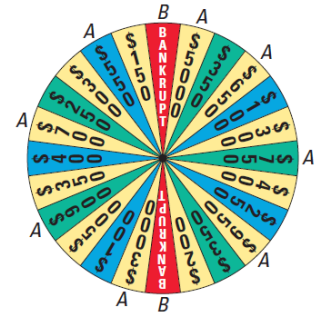
- **Independent Events:**
 - Events are not related
 - **With replacement:** whatever is picked is put back before second pick
 - Denominator stays the same
- **Dependent Events:**
 - Events are related
 - **Without replacement:** whatever is picked is NOT put back before second pick
 - Denominator decreases 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?

7) A green die and red die are tossed. What is the probability that a “4” shows on the green die and a “5” shoes on the red die?

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?



9) A box contains 5 red marbles and 7 green marbles. Find the probability of drawing 2 red marbles:
 a) with replacement
 b) without replacement

10) A bag contains 3 red marbles, 7 white marbles, and 5 blue marbles. You draw 3 marbles, replacing each one before drawing the next. What is the probability of drawing a red, then a blue, and then a white marble?

11) There are 6 pennies, 9 nickels, and 3 dimes in a box. Find the probability of...
 a) P(2 nickels)—without replacement:
 b) P(1 nickel and then a dime)—with replacement:

c) P(1 nickel and then 1 dime)—without replacement:
 d) P(1 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?

HOMEWORK: Text page 565-566, 572-573

Compound Events In Exercises 19–21, the spinner is divided into 12 equal parts. Given events A and B , find $P(A \text{ or } B)$.



- 19. Event A : Spinner lands on the number 3.
Event B : Spinner lands on yellow.
- 20. Event A : Spinner lands on an even number.
Event B : Spinner lands on blue.
- 21. Event A : Spinner lands on a number less than or equal to 4.
Event B : Spinner lands on red.

Biology Link In Exercises 28 and 29, use the following information.

A blood bank records the blood types, including positive or negative Rh-factor, during a blood drive. The table shows the number of donors with each type of blood.

		Blood Type				
		O	A	B	AB	Total
Rh-Factor	Positive	146	134	36	15	331
	Negative	26	26	11	6	69
	Total	172	160	47	21	400

- 28. Find the probability a donor chosen at random has type O or AB blood.
- 29. Find the probability a donor chosen at random has type A blood or is Rh-positive.

Identifying Events Tell whether the events are *independent* or *dependent*. Explain.

- 11. You spin a spinner, then roll a die.
- 12. You draw a card at random, then draw another without replacing the first.
- 13. You choose one raffle ticket at random from each of two different bags.
- 14. You draw a name from a bag, return the name, shake the bag, and draw again.

Rolling a Number Cube In Exercises 18–20, you are playing a game that involves rolling a six-sided die. Find the indicated probability.

- 18. rolling an even number and then an odd number
- 19. rolling a number less than 3 and then a number greater than 3
- 20. rolling an odd number and then a 2

Drawing Cards Find the probability of drawing the given cards at random from a standard 52-card deck (see page 547) under each condition: (a) with replacement and (b) without replacement.

- 25. a club, then a spade
- 26. an ace, then a queen