

7.1 Probability

SWBAT calculate probabilities and determine if two events are independent.

Assignment:

HW52

Vocabulary

- ▶ **Probability**

- ▶ a measurement that explains how likely something is to occur

- ▶ **Outcome**

- ▶ result of a single trial

- ▶ **Sample Space**

- ▶ the set of all possible outcomes

Finding the Sample Space and the Number of Possible Outcomes

A football player attempts a pass in overtime. The pass attempt can result in a completion, an incomplection, or a turnover.

When a button is pressed, a computer program outputs a random even number greater than 0 and less than 10. You press the button once.

A spinner can land on either red, blue, green, or yellow. You spin once.

A sandwich shop has four types of sandwiches: ham, turkey, chicken, and PB&J. Each sandwich can be ordered with white bread, multi-grain bread, or rye bread.

Finding the Probability of an Event

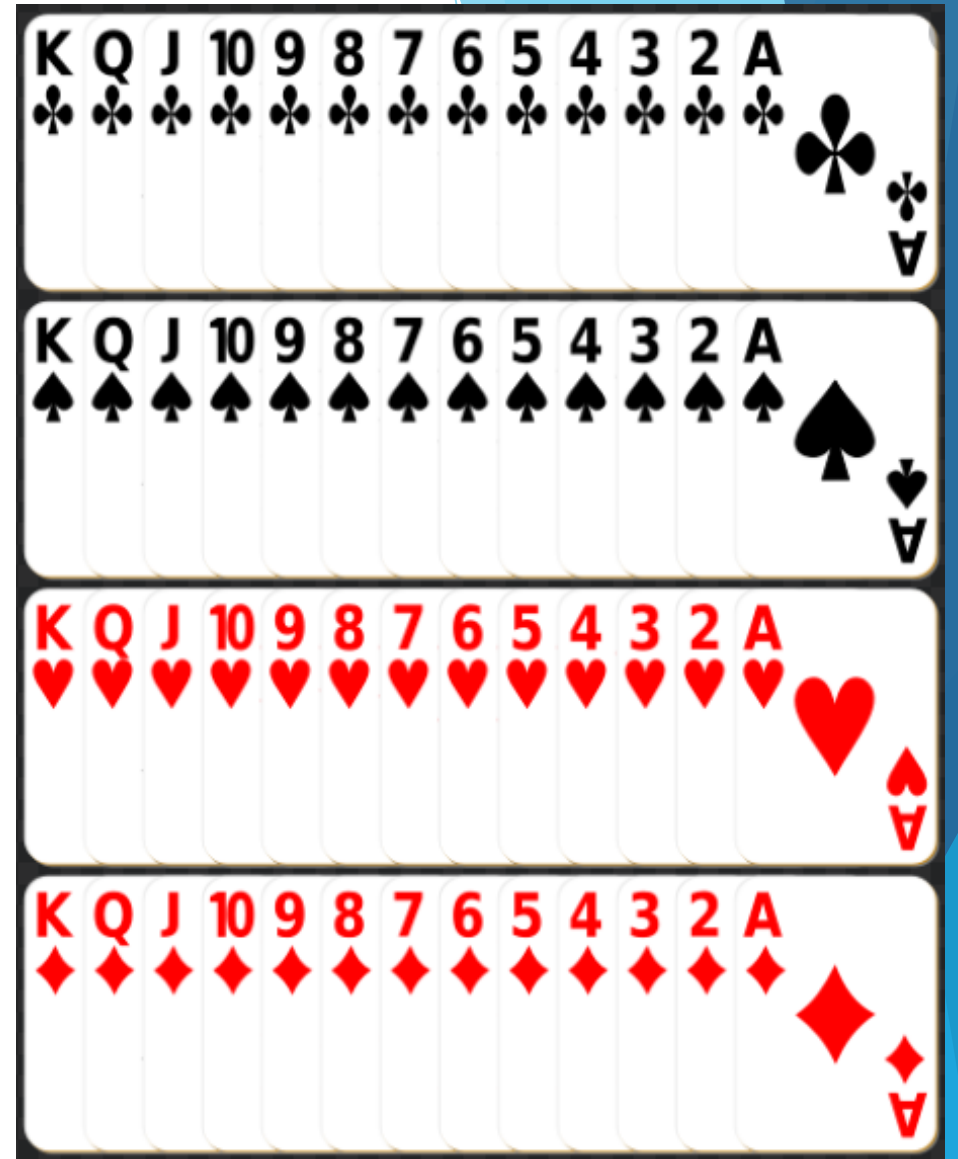
Given a standard six-sided die, what is the probability of rolling a 3?

Theoretical Probability formula

▶ $P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}}$

▶ Probability calculations will always result in a fraction between 0 and 1

1. Given a standard six-sided die, what is the probability of rolling a number less than 6?
2. Given a standard six-sided die, what is the probability of rolling an even number?
3. Given a standard deck of 52 cards, what is the probability of drawing a red ace?
4. Given a standard deck of 52 cards, what is the probability of drawing a number smaller than 7, aces included?
5. A bowl contains twelve slips of paper corresponding to the twelve months of the year. What is the probability that drawing a slip of paper will result in a month that starts with the letter M?



A standard deck of 52 cards. Depending on the game, the A (ace) may be worth 1 or 11

7.2 Independent vs. Dependent

Independent and Dependent Events

- ▶ Given a standard deck of 52 cards, what is the probability that you draw a king?
 - ▶ Suppose you draw a king from a standard deck of 52 cards and replace it. What is the probability that the next card you draw is also a king?
 - ▶ What if you do not replace the king?
- ▶ **Independent Events**
 - ▶ Events that do not influence one another. The probability that the second outcome occurs is not impacted or changed by the first.
 - ▶ **Dependent Events**
 - ▶ Events that do influence each other. The occurrence of one event changes the probability of the second event.

Determine whether the events are independent or dependent.

Your sock drawer has six white socks, two brown socks, and six black socks. You randomly pick a sock and put it on your left foot and then pick another sock and put it on your right foot. You leave the house with a white sock on your left foot and a brown sock on your right foot.

A bag contains eight red marbles and four blue marbles. You randomly pick a marble and then return it to the bag before picking another marble. The first marble is red and the second marble is blue.

Probability of Independent Events

- ▶ If two events are independent, multiply each probability to get the probability that *both* will occur.

There are four nickels and five dimes in your pocket. You randomly pick a coin out of your pocket and then return it to your pocket. Then you randomly pick another coin. Both times the coin is a nickel.

- ▶ Are the events independent? Why or why not?

$$P(A) = \frac{3}{5} \quad P(B) = \frac{1}{2} \quad P(A \text{ and } B) = \frac{6}{25}$$

$$P(A) = \frac{9}{20} \quad P(B) = \frac{7}{20} \quad P(A \text{ and } B) = \frac{63}{400}$$