

Independent Events

Name: _____ Date: _____

How can probabilities be calculated when **events are independent** from one another and when they are dependent on one another?

Independent Events

Occurrence of one event has no effect on the occurrence of another event. To find the probability of A occurring and then B occurring (where A has no effect on B) you simply multiply the probabilities.

$$P(A \cap B) = P(A) \times P(B)$$

Consider the following situations...

1. You roll a single die twice.
 - a) Calculate the P(rolling a 3) on the first roll.
 - b) Calculate the P(rolling a 3) on the second roll.
 - c) Calculate the P(rolling a 3 twice in a row)

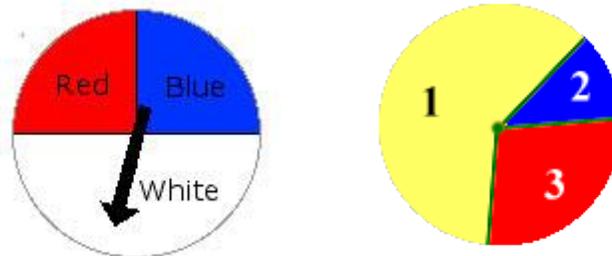
Solution:

2. Calculate the probability of flipping a head, rolling a six (on a six sided die) and selecting an ace from a deck of cards.

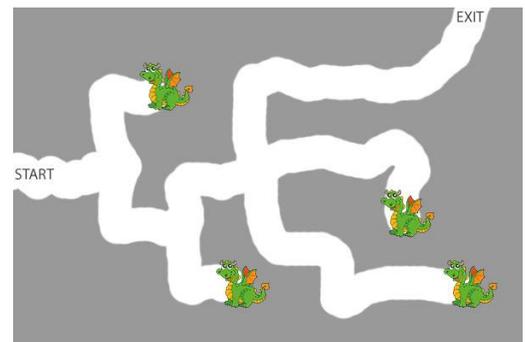
Solution:

Questions:

1. A family wants to have three children. Calculate the probability that the family would have 3 girls given that the chance of have a boy or girl is 50%.
2. Shannon has four highlighter pens in her pencil case: two yellow, one orange, and one blue. She reaches into the case and pulls out one highlighter, and then replaces it; she then reaches in again to select another one.
 - a) Calculate the probability of getting two yellow highlighters in a row.
 - b) Calculate the probability of getting a yellow followed by a blue.
3. Two green tiles, one red tile, and a blue tile are put into a paper bag.
 - a) Calculate the probability that a green tile is drawn, followed by a blue tile assuming that the first tile is replaced before the second is drawn.
 - b) How does the answer to part a) change if the first tile drawn is not replaced? Calculate the probability in this case.
 - c) Explain why these answers are different.
4. Consider the following game. Two spinners are spun independently. Player A wins if the result is blue-1. Player B wins if the result is white-2. Is this game fair?



5. Calculate the probability selecting an ace from a deck of cards and rolling a number greater than 10 with a pair of dice.
6. While playing an adventure game a character must make it through a maze. There is only one correct path and there is not time to decide so the player must randomly choose at each junction. If the choice for each junction is equal calculate the probability the player makes it out.



Extension Problem – The Dungeon

Consider the situation below where a knight must travel various paths that lead to two separate rooms. The knight when reaching a junction has an equal chance of selecting a given path to travel down. Calculate the probability (if he randomly selects at each junction) of ending in Room A and in Room B.

