15.5

Independent & Dependent Events

Do Now

1. **Describe two possible ways to find the total number of possible outcomes of spinning the spinner and rolling the number cube.**

2. **Give a real-life example of a compound event.**

Learning Target:

- I can identify independent and dependent events.
- I can use formulas to find probabilities of independent
- and dependent events.

Key Vocabulary & Idea:

compound events may be *independent events* or *dependent events.*

Independent Events

when the _____ of one event _____ _____

affect the _____ that the other event(s) will

occur.

Probability of Independent Events

The probability of two or more independent events is the product of the probabilities of the events.

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

$$P(A \text{ and } B \text{ and } C) = P(A) \bullet P(B) \bullet P(C)$$

Finding the Probability of Independent Events

You spin the spinner and flip the coin. What is the probability of spinning a prime number and flipping tails?

Does the outcome of spinning the spinner affect the outcome of flipping the coin?
Therefore, the events are *independent.*

Practice

What is the probability of spinning a multiple of 2 and flipping heads?

Key Vocabulary & Idea:

compound events may be *independent events* or *dependent events.*

Dependent Events

when the _____ of one event _____ affect the _____ that the other event(s) will occur.

Probability of Dependent Events

The probability of two or more dependent events A and B is the probability of A times the probability of B after A occurs.

$$P(A \text{ and } B) = P(A) \bullet P(B \text{ after } A)$$

Finding the Probability of Dependent Events:

People are randomly chosen to be game show contestants from an audience of 100 people. You are with 5 of your relatives and 6 other friends. What is the probability that one of your relatives is chosen first, and then one of your friends is chosen second?

Does choosing an audience member change the number of audience members left? Therefore, the events are dependent.

Practice

What is the probability that you, your relatives, and your friends are not chosen to be either of the first two contestants?

Finding the Probability of Dependent Events:

A student randomly guesses the answer for each of the multiple-choice questions. What is the probability of answering all three questions correctly?

1. In what year did the United States gain independence from Britain?

A. 1492 **B.** 1776 **C.** 1788 **D.** 1795 **E.** 2000

2. Which amendment to the Constitution grants citizenship to all persons born in the United States and guarantees them equal protection under the law?

A. 1st **B.** 5th **C.** 12th **D.** 13th **E.** 14th

3. In what year did the Boston Tea Party occur?

A. 1607 **B.** 1773 **C.** 1776 **D.** 1780 **E.** 1812

Does choosing the answer for one question affect the choice for the other questions?

Finding the Probability of Dependent Events:

1. In what year did the United States gain independence from Britain?
   A. 1492 **B.** 1776 **C.** 1788 **D.** 1795 **E.** 2000
2. Which amendment to the Constitution grants citizenship to all persons born in the United States and guarantees them equal protection under the law?
   A. 1st **B.** 5th **C.** 12th **D.** 13th **E.** 14th
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Does choosing the answer for one question affect the choice for the other questions?

Practice

A student can eliminate Choice A for all three questions. What is the probability of answering all three questions correctly? Compare this probability with the probability in the previous problem. What do you notice?