Compound Probability

Today I Can

1. Identify independent and dependent events.
2. Find compound probabilities.

Compound Event

An event that is made up of 2 or more events.

Independent Events

When the occurrence of one event **does not affect** how another event occurs.

Dependent Events

When the occurrence of one event **does affect** how another event occurs.

Example 1. Determine if the outcomes of each of the following trials are independent or dependent events.

(a) Choose a number tile from 12 tiles. Then spin a spinner.

(b) Pick one card from a standard deck of cards. Then, without replacing the card, pick another card.

(c) Pick one card from a standard deck of cards. Then, replace the card and pick another card.

Probability of Independent Events

If A and B are independent events, then

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

Example 2. A desk drawer contains 5 red pens, 6 blue pens, 3 black pens, 24 silver paper clips, and 16 gold paper clips.

If you select a pen and paper clip from the drawer without looking, find each probability.

(a) Select a blue pen and gold paper clip.

(b) Select a red pen and a silver paper clip.

Mutually Exclusive Events

Events that cannot happen at the same time.

If A and B are mutually exclusive events, then

- $P(A \text{ and } B) = 0$
- $P(A \text{ or } B) = P(A) + P(B)$

Example 3. Student athletes at a local high school may participate in only one sport each season. During the fall season, 28% of student athletes play basketball and 24% are on the swim team. What is the probability that a randomly selected student athlete plays basketball or is on the swim team?

Overlapping Events

Events that have outcomes in common.

If A and B are overlapping events, then

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

Example 4. A single die is rolled once.

(a) What is the probability of rolling either an even number or a multiple of 3?

(b) What is the probability of rolling either an odd number or a number less than 4?