Independent and Dependent Events

Compound Event: consists of 2 or more simple events

Independent Events: the probability of one event DOES NOT effect the probability of a 2nd event.

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

Dependent Events: the probability of one event DOES effect the probability of a 2nd event.

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

When determining probabilities of Independent or Dependent events, you will MULTIPLY the two probabilities. Also, when reading the problem, you will notice the word AND used. This signifies that is a problem involving independent or dependent events, and tells you to multiply.

KEY INFO

When working on problems that deal with decks of cards, please refer to this information.

52 total cards in a standard deck, half of the cards are red and half are black

4 suits: hearts, diamonds, clubs and spades

13 cards in each suit: 2,3,4,5,6,7,8,9,10, Jack, Queen, King, Ace

Determining Independent and Dependent Events

EX: Identify whether the following events are independent or dependent.

a) A card is selected from a deck of cards and kept. Then a second card is selected.

These are independent events. By replacing the card, there are the same amount in the deck when you pick the 2nd card. You could pick the same card twice.

b) Andrea selects a shirt from her closet to wear on Monday and then a different shirt to wear on Tuesday.

These are dependent events. Once the first shirt is chosen, there are fewer shirts to choose from. You will not pick the same shirt twice.

Independent Event Example

EX. A coin is tossed and a die is rolled. What is the probability that the coin lands heads up and the number rolled is a 6?

Reminder, a regular die (plural is dice) has 6 numbers on it (1,2,3,4,5,6).

These are independent events. One does not alter the occurrence of the other.

P(heads up and 6) = P(heads up) • P (6)

$$= \frac{1}{2} \bullet \frac{1}{6}$$

$$= 1/12$$

Dependent Event Example

EX: Three cards are selected at random from a standard deck of 52 cards. What is the probability that all three cards are diamonds if neither the first nor the second card are replaced?

We are looking for diamond and diamond and diamond. So we know we need to multiply. They are dependent, since we are not replacing the cards after each pick.

$$P(\diamond \text{ and } \diamond \text{ and } \diamond) = \frac{13}{52} \bullet \frac{12}{51} \bullet \frac{11}{50}$$

$$= \frac{1716}{132,600} = .013$$

There are 13 diamonds. After the first pull, there are only 12. After the 2nd pull, there are only 11. These are numerator numbers.

There are 52 cards to start with, but after first pull there are only 51 and after 2nd pull there are only 51. These are denominator numbers.