Worksheet 7B

Independent events: two events are independent if the occurrence or non-occurrence of one event does not affect the probability of the other event.

If events A and B are independent, then the probability that A and B both occur is

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

Overlapping/Non-overlapping event: Two events are *non-overlapping* if they cannot occur together. Two events are *overlapping* if they can occur together.

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

The At Least Once Rule: The probability that event A occurs *at least once* in n independent trials is

$$P(A \text{ occurs at least once in } n \text{ trials}) = 1 - P(\text{not } A)^n$$

For Problems 1-4, determine whether the events described in each exercise are independent or dependent. Then find the AND probability of the events.

1) You roll a dice once. The event of getting number 4 and the event of getting an even number.

2) You roll a dice once. The event of getting number greater than 3 and the event of getting an even number.

3) You roll a dice twice. The event of getting number greater than 3 on the first roll and the event of getting an even number on the second roll.

4) You roll a dice once. The event of getting number greater than 4 and the event of getting an odd number.

For Problems 5-6, determine whether the events described in each exercise are overlapping or non-overlapping. Then find the OR probability of the events.

5) You draw a card from a deck of 52 cards. The event of getting a Queen and the event of getting a club.

6) You draw a card from a deck of 52 cards. The event of getting a black Ace and the event of getting a red King.

7) Find the probability of getting rain *at least once* in three consecutive days when the probability of rain on each single day is 0.3.

8) (*More practice on Multiplication Principle*) Find the number of 3-digits numbers in which the digit 7 appears exactly once.