9-6 Properties of Probability

1. You draw 2 cards from the deck of 52 **without replacing** the first card before you draw the second. What is the probability that both cards will be red?

2. You draw 2 cards from the deck and **replace** the first card before you draw the second. What is the probability that both cards will be red?

Intersection of Events

P(A and B) = P(A ∩ B) =$P(A) \cdot P(B|A)$ if two events are dependent(do not replace)

P(A and B) = P(A ∩ B)= $P(A) \cdot P(B)$ if two events are independent

3. A cookie container has 10 chocolate chip cookies, 11 macadamia nut, 12 oatmeal and 7 oatmeal-chocolate. If you select 1 cookie at random, what is the probability:
   a) it will be contain oatmeal or chocolate?

   b) it will be macadamia or chocolate chip?

Union of Events

P(A or B) =$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

P(A or B) = $P(A \cup B) = P(A) + P(B)$ if two events have no intersection

4. Calvin and Phoebe volunteer in the children's ward of a hospital. The probability that Calvin gets mumps as the result of a visit is P(C)= 13% and the probability that Phoebe gets mumps is P(Ph) = 7%. Find the probability of each event.

a) Both catch mumps

b) Calvin does not catch mumps

c) Phoebe does not catch mumps

d) Neither Calvin nor Phoebe catches mumps

e) At least one of them catches mumps

Complementary Events

The probability that event A will not occur is $P(\text{not } A) = 1 - P(A)$

5. Drew has these probabilities of passing various classes: Physics 90%, PreCalc 95%, and Spanish 80%. Find the probability of each event.
   a) Passing all three

   b) failing all three

   c) passing at least one

   d) passing exactly one