**11.3 Probability of Multiple Events**  
Objective: To find the probability of event A and B.

To find the probability of event A or B

**Independent Events:** if the occurrence of one event has NO effect on the occurrence of the other. (Ex: spinning a wheel, rolling a die, flip a coin, draw a marble with replacement)

**Dependent Events:** if the occurrence of one event AFFECTS the occurrence of the other. (Ex: Drawing marbles or cards without replacing)

**Probability of A and B (Independent):**

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

* P(A and B) = P(A) \* P(B)

**Probability of A and B (Dependent):**

The probability that event B will occur given that A has already occurred:

* P(A and B) = P(A) \* P(B) 🡨 prob of B given A

**Mutually Exclusive Events:** Event A and Event B share no intersection.

* P(A and B) = 0

**Probability of A or B:**

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

* P(A and B) = P(A) + P(B) – P(A and B)

*If event A is drawing a queen from a deck of cards and event B is drawing a king from the remaining cards, are the events A and B dependent or independent?*

Dependent

*If event A is rolling a two on a six-sided die and event B is rolling a four on a different six-sided die, are the events A and B dependent or independent?*

Independent

*Events A and B are independent. Find the indicated probability.*

*a) P(A) = 0.3 b) P(A) = \_.2\_\_*

*P(B) = 0.9 P(B) = 0.3*

*P(A and B) = \_\_.27\_\_ P(A and B) = 0.06*

*A jar contains 12 red marbles, 16 blue marbles, and 18 white marbles.*

*a) Find the probability of choosing a red marble and then a white marble is chosen with replacement.*

*b) Three marbles are chosen from the jar with replacement. What is the probability that all are white?*

*c) Four marbles are chosen from the jar with replacement. What is the probability that none are blue?*

*Three friends are taking an English class that has a summer reading list. Each student is required to read one book from the list, which contains 3 biographies, 10 classics, and 5 historical novels.*

*a) Find the probability that the first friend chooses a biography, the second chooses a classic, and the third chooses a historical.*

*b) Find the probability that the three friends each choose a classic.*

*In a survey of 200 pet owners, 103 owned dogs, 88 owned cats, 25 owned birds, 18 owned reptiles.*

*a) None of the respondents owned both a cat and a bird. What is the probability that they owned a cat or a bird?*

*b) Of the respondents, 52 owned both a cat and a dog. What is the probability that a respondent owned a cat or a dog?*

*c) Of the respondents, 119 owned a dog or a reptile. What is the probability that they owned a dog and a reptile?*

**Complement:** the probability of the complement of A is:

* P(A’) = 1 – P(A)

*Find P(A’)*

*a) P(A) = 0.75 b) P(A) = 4/7*

0.25 3/7

**HMWK: page 691 #1-7, 9-12, 13-31 (odd)**