Chapter 17: Probability Models

Bermouli Trials:

- Two possible outcomes~ success/ failure
- Probability, p, is constant for each trial
- Each trial is independent

*To test a Bermouli trial you can use a Geometric model, a Binomial model or a Normal model

Geometric Model:

~ one parameter, p, (probability of success) represented by Geom(p)

P = success q: (p-1)=failure x= # of trials

P(X=x) = qx-1p expected value: μ=1/p

Standard deviation: σ= $\sqrt{q/p^2}$

*consider the 10% condition: sample is smaller than 10% of the population

Ex: The American Red Cross says that about 11% of the U.S. population has Type B blood. A blood drive is being held in your area.What is the probability that the fourth blood donor is the first donor with Type B blood?

$$p(4)=q^{4-1}\times p=(.89)^{4-1}(.11)=.89^3\times .11=.0775$$

Binomial Model:

~ two parameters, Binom(n,p)

Probability of *k* success in *n* trials is: b(n,k,p)

$$(x+a)^n=\sum_{k=0}^{n}\binom{n}{k}x^k a^{n-k}$$

Mean: μ=np standard deviation: σ= $\sqrt{npq}$

-a binomial model describes the number of successes in a specified number of trials two parameters= # of trials, probability of success, p,

*still check 10% condition

* success/failure condition: at least 10 successes and 10 failures

Ex: only 6% of people have o-negative blood. Suppose 20 donors come to the blood drive. What is the probability that there are 2 or 3 universal donors?

P(X=2 or 3)=P(X=2)+ P(X=2)

$\binom{20}{2}(.06)^2(.94)^{18}$ + $\binom{20}{3}(.06)^3(.94)^{17}$ ~ *.2246+.0860= .3106*