**A is a type of probability experiment with the following characteristics:**

1. **There are only two possible outcomes, which can be labeled as success or failure**
2. **There are a fixed number of trials**
3. **Each trial is independent**
4. **The probability of a success is the same on each trial**

**n – the number of trials of the experiment**
**p – the probability of success**
**q – the probability of failure** **NOTE: $q = 1 - p$**
**x – the number of successes we wish to observe**

**Suppose we have three randomly selected students who want to enroll at Clemson University. If 54% of all applicants are accepted to Clemson what is the probability that….**

1. **All three of the applicants are accepted?**
2. **None of the three are accepted?**
3. **Exactly one of the three are accepted?**
4. **Exactly two of the three are accepted?**

**First, what are all the possible outcomes?**

**The probability of x successes in n trials of a binomial experiment with probability of success p is:**

$$\mathbf{P}(\mathbf{x}) = \mathbf{C} \cdot \mathbf{p} \cdot \mathbf{q}^{-}$$

**The calculator has built-in functions to calculate these probabilities, so you don't need to worry about remembering this formula.**

**A                                              is a type of discrete probability distribution where each value of the random variable x is listed, together with its associated binomial probability.**

**(Ex) Create a binomial distribution for the three students who want to be admitted to Clemson.**

**(Ex) What is the mean and standard deviation of this distribution?**

**(Ex) Create a cumulative binomial distribution for this example.**

$\mu =$

$\sigma = \sqrt{\mathbf{npq}}$

**The calculator can be used to calculate binomial probabilities using the functions:**

1. **binompdf(n, p, x) - calculates the probability of exactly x successes: $\mathbf{P(X = x)}$**
2. **binomcdf(n, p, x) – calculates the probability of at most x successes: $\mathbf{P(X \le x)}$**

**In order to answer questions involving the probability of at least x successes, or more than x successes, or other similar language, you have to learn how to properly manipulate binomcdf in order to do so.**

**Some hints that can help you out are, if the probability you want asks for:**

1. **exactly x successes – use binompdf(n, p, x)**
2. **no more than or less than or equal to x successes – use binomcdf(n, p, x)**
3. **fewer than or less than x successes – use binomcdf(n, p, x – 1)**
4. **more than or greater than x successes – use 1 – binomcdf(n, p, x)**
5. **at least x successes – use 1 – binomcdf(n, p, x – 1)**

**You can find these functions by going to the distribution menu: press [2   ] [VARS].**

**In addition, the app: [https://davidf628.github.io/applets/stats_binomial_distribution.html](https://davidf628.github.io/applets/stats_binomial_distribution.html), can be used to help visualize the calculation of binomial probabilities.**

**1. The probability that person is left handed is 10%. If 15 people are asked, what is the probability that exactly five are left-handed?**

**2. The probability that a household owns a personal computer is 45%. If 20 households are surveyed, what is the probability that exactly 10 have a personal computer?**

**3. Sixty-five percent of the population has brown eyes. If 8 people are chosen at random, what is the probability that fewer than 3 of them have brown eyes?**