7.2 Binomial Distributions

Repeated independent trials measured in terms of successes or failures are **Bernoulli trials**.

A **Binomial Distribution** is the probabilities when each event is independent. In other words, the probability of success is the same on each trial.

1. While Tree Planting, my quality would be checked every day by a manager that walked through my land. He would place a shovel down somewhere and then check the quality of the trees within a 3m distance. He would check 3 different plots each with about 12 trees. If I plant at a 97% quality level, what is the probability that he will find
   i) no bad trees,
   ii) 1 bad tree,
   iii) 3 bad trees?

Probability in a Binomial Distribution

$P(x) = {}_nC_x\, p^x q^{n-x}$ where p is the probability of success on any individual trial and q = 1 – p is the probability of failure.

Expectation for a Binomial Distribution

$E(x) = np$

2. A chocolate company manufactures 40% white chocolates and the 60% brown. Chocolates are chosen at random and placed into a box of 10.
   a) What is the expected number of white chocolates in a box?
   b) What is the probability that two or less candies in a given box are white?
   c) What is the probability that less than two candies in a given box are white?

3. You forgot to study for your history quiz. The quiz consists of 10 multiple choice questions with 4 options for each question. You randomly guess the answer to each question. Show a probability distribution for the number of correct answers.

# correct	Probability