STAT 2857A – Lecture 10 Examples and Exercises

Example 11.1

An accountant is conducting a financial audit on a big, multinational company. The company has 200 accounts, of which 20 have errors.

Suppose that the accountant checks 10 randomly selected accounts. Let Y be the number of accounts with errors in her sample.

a) What is the distribution of Y?
b) What is the probability that $Y = 2$?
c) What are the mean and variance of Y?

Example 11.2

An accountant is conducting a financial audit on a big, multinational company. The company has 200 accounts, of which 20 have errors.

Suppose that the accountant checks 10 randomly selected accounts. Let Y be the number of accounts with errors in her sample.

a) Is it appropriate to approximate the distribution of Y by a binomial?
b) What is the approximate distribution of Y?
c) Approximate the probability that $Y = 2$.
d) Approximate the mean and variance of Y.

Example 11.3

An accountant is conducting a financial audit on a big, multinational company. The company has 200 accounts, of which 20 have errors.

Suppose that the accountant samples accounts *with replacement* until she finds 2 with errors. Let Z denote the number of accounts without errors in her sample.

a) What is the distribution of Z?
b) What is the probability that $Z = 10$?
c) What are the mean and variance of Z?

Exercise 11.1

Suppose that packages of Smarties each contain 30 smarties and that there is a .25 probability that each Smartie is red. For each of the following problems: i) identify the distribution of the random variable, ii) compute the mean and variance, iii) compute the probability provided.

a) The number of red Smarties in a package and the probability that the package contains more than 10 red Smarties.
b) The number of red Smarties you pick if you draw 5 Smarties without replacement from a pack containing exactly 8 red Smarties. The probability this number is less than 3.
c) The number of package you must open until you find a package with no red smarties. The probability you open exactly 5000 boxes until finding one with no red candies.