Instructions

(1) This assignment is due on Friday October 6th.
(2) Please submit your written solutions to crowdmark with each problem started on a separate page.
(3) Please list your collaborators on your assignment. It's important to give credit to those you have worked with.

Question 1 (Binomial Distribution)**.** Let X be a binomial random variable with n trials and Y be a binomial random variable with m trials, Assume both X and Y have the probability of success p. Find the probability mass function for $Z = X + Y$.

Question 2 (Binomial Distribution)**.** Suppose that Samsung claims that 1% of their microchips are defective.

(a) If you buy 10 microchips, what is the probability that none are defective?
(b) If you buy 50 microchips, what is the probability that exactly 2 are defective?
(c) If you buy 50 microchips, what is the probability that more than 3 are defective?

Question 3 (Negative Binomial distribution)**.** Billy is selling cookies to raise money for a school trip. Suppose the probability of a random passerby buying a cookie is $p = 0.1$ and that nobody buys more than one cookie.

(a) What is the probability that Billy sells 2 cookies to the next 3 people?
(b) If Billy has 10 cookies left, what is the probability he sells his last cookie to the 20th passerby?
(c) How many people should Billy expect to walk past before he sells all his cookies?