1. Consider a binomial probability distribution with \( n = 300, \ p = 0.6 \), and \( x \) be the number of successes,

(a) (2 points) Find \( P(x = 175) \)

(b) (2 points) Find \( P(x < 190) \)

(c) (2 points) Find \( P(x > 170) \)

(d) (2 points) Find \( P(x \leq 165 \text{ or } x \geq 195) \)
2. A student takes a multiple-choice test with 10 questions and guesses randomly at each answer. Each question has 5 choices with only one correct choice.

(a) (2 points) Find the probability that he/she gets exactly 3 correct answers.

(b) (2 points) Find the probability that he/she gets fewer than 3 correct answers.

(c) (2 points) Find the probability that he/she gets at least 3 correct answers.

(d) (2 points) Find the mean number of correct answers he/she can get.

(e) (2 points) Find the variance of the number of correct answers he/she can get.

(f) (1 point) Find the standard deviation for the number of correct answers that he/she can get.

(g) (2 points) Find the usual range for number of correct answers he/she can get.
3. The probability that a passenger with ticket show up for a flight is 0.9. An airline sells 142 tickets for a flight that has 125 seats.

(a) (2 points) Find the probability that exactly 125 passengers with tickets show up for this flight.

(b) (2 points) Find the probability that fewer than 125 passengers with tickets show up for this flight.

(c) (2 points) Find the probability that more than 125 passengers with tickets show up for this flight.

(d) (3 points) Find the probability that the number of passengers with tickets show up for this flight is from 120 to 125.

(e) (2 points) Find the mean number of passengers with ticket that show up for this flight.

(f) (2 points) Find the standard deviation for the number of passengers with ticket that show up for this flight.

(g) (2 points) Find the usual range for number of passengers with ticket that show up for this flight.
4. One-sixth of freshmen entering a large state university are out-of-state students. If the students are assigned at random to the dormitories, 180 to a building, what is the probability that in a given dormitory

(a) (2 points) at most 40 of them are from out of state.

(b) (2 points) at least 40 of them are from out of state.

(c) (2 points) at most one-fifth of them are from out of state.

(d) (2 points) at least two-fifteenths of them are from out of state.

(e) (2 points) Find the mean number of out of state students in a given dorm.

(f) (2 points) Find the standard deviation for the number of out of state students in a given dorm.

(g) (2 points) Find the usual range for number of out of state students in a given dorm.