Assignment
Probability Distributions

1. Simultaneously 10 coins were tossed, the probability of getting head for each coin is 0.6. What is the probability of getting 4 heads?

2. Three employees are randomly selected. The probability a single employee is between 180 and 185 cm is 0.1157.

    a) What is the probability that all three are between 180 and 185 cm height?
    b) What is the probability that none are between 180 and 185 cm?

3. Let's do a "shock" study and select 4 students. Let's name them as
    a) Carol
    b) Zack
    c) Sarah
    d) James

    a. What exactly be the chance one of them will be success? Assume that 35% of the students a success.

    b. Verify the situation where Carol is the only one to refuse to give the most severe shock has probability (0. 3) * (0.65) ^ 3

4. On observing 59 Passengers or fewer at station who are constantly using mobile in a sample of 400. If the true portion of passengers on using mobile is p = 0.20. Use the normal approximation to estimate the probability of passengers using mobile 59 or fewer?

5. A survey indicates that for each trip Zack goes on for shopping in mall and spends an average μ=45 minutes with a standard deviation of σ=12 minutes. The length of time spent in the mall is normally distributed and is represented by the variable x.
    If 200 shoppers enter the mall, how many shoppers would you expect to be in the mall for each interval of time listed below?
    a) Between 24 and 54 minutes
    b) More than 39 minutes

6. A truck from Gati has to carry load from Mumbai to Chennai. The amount of diesel consumed is normally distributed random variable X, with $\mu = 5.7$, $\sigma = 0.5$. Freight management wants to find the amount of fuel to fill so that there will be 0.99 probability that truck reaches Chennai on time.

7. Consider 80% of all business start-ups in the IT industry in the city report that they generate a profit in their first year. If a sample of 10 new IT business start-ups are selected, find the probability that exactly seven will generate a profit in their first year.

8. A roulette wheel consisting of 38 numbers 1 through 36, 0, and double 0. If Sam always bets that the outcome will be one of the numbers 1 through 12, what is the probability that Sam will lose his first 5 bets?

9. Ram got fever and has gone for diagnostic centre for test. A diagnostic test has a 0.95 probability of giving a positive result when tested on person affected with typhoid and 0.10 probability of giving as (false) positive when applied to non-typhoid.

   It is estimated that 0.5% of the population are suffering from typhoid. If a person is selected from the population and suppose a test is conducted on him where we have no relevant information relating to fever.
   Calculate the following probabilities:
   A. that the test result will be positive;
   B. that, given a positive result, the person is a suffering from typhoid;
   C. that, given a negative result, the person is a non-typhoid;
   D. that the person will be misclassified.

10. Brooklyn High School's A level is normally distributed. The total data which is 95% is between the age 15.6 and 18.4. Can you find the mean and standard deviation?

11. For a job interview a test has been taken and the final results have a mean of 70 and a standard deviation of 10. If normally distributed what percent of the job seekers.

    a) Test score higher than 80?
    b) Should pass the test (Test score $\geq$ 60)?
    c) Should fail the test (Test score <60)

12. The longevity of musical instruments used by musicians has a normal distribution with mean of 12 months and standard deviation of 2 months. Find the probability that an instrument used by musicians will last.