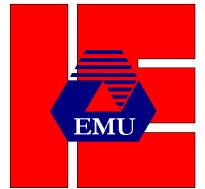




EASTERN MEDITERRANEAN UNIVERSITY
Department of Industrial Engineering
IENG385 Statistical Engineering
HOMEWORK 1 Fall 2018-19



- 1) A lot of 10 items contains 5 defective items. 3 items are chosen at random and tested, Let X denote the number of defectives
 - (a) Find all possible values and probability of each value of X and probability mass function of X .
 - (b) A lot is accepted if 1 or fewer of the 3 items are defective. What is the probability that the lot is accepted?
- 2) Suppose that X has a binomial distribution with parameters 8 and 0.5 show that $X = 4$ is the most likely outcome.
- 3) Find expected value of $Y = 3X^2 - 5$ where $X = N(\mu, \sigma) = N(4, 2)$.
- 4) If you buy a lottery ticket in 100 lotteries, in each of which your chance of winning a prize is 0.02, what is the (**approximate**) probability that you will win 2 prizes (a) at most three, (b) exactly once, (c) at least one?
- 5) Let X be a random variable with probability density

$$f(x) = \begin{cases} c + (1 - 2x^4) & -1 < x < 3 \\ 0 & \text{otherwise} \end{cases}$$

- (a) What is the value of c ?
- (b) Compute $P(-1.2 < X < 4.5)$.
- 6) Suppose that the service time of customers at a bank X is an exponential random variable with parameter $\lambda = 0.1$. The person ahead of you has been served for 10 minutes, what is the probability that you will wait another 10 minutes or more before getting served?
- 7) Assuming that you have a normal distribution, what percentage of your distribution would have z-scores between -1.2 and 1.3? Use the area under the normal curve.
- 8) X is a normally distributed variable with mean $\mu = 30$ and standard deviation $\sigma^2 = 16$. Find
 - a) $P(x < 31)$
 - b) $P(x > 20)$
 - c) $P(20 < x < 25)$
 - d) $P(20 < \bar{x} < 25)$
- 9) Monthly cell phone bills for residents of a city have mean \$65 and variance 144. Random sample with size 100 is drawn.
 - a) What is the probability that the bill of one resident in this sample is greater than \$64?
 - b) What is the probability that the mean of this sample is greater than \$66?