Course: STAT-319
Term: 181
Homework # 4
Material: Sections 4.6, 4.7 & 4.11 and Chapter 7
Due Date: Thursday, 25-October-2018

Q1: Workers in silicon factories are prone to a lung disease called silicosis. In a recent survey in a factory, about 11% of the workers have been infected by it. Assume the same rate of infection holds everywhere. Use the normal distribution to approximate the probability that, out of a random sample of 425 workers, the numbers that are prone to infection at present will be

a) 30 or more;
b) 28 or less.

Q2: The daily high temperature in a computer server room at the university can be modeled by a normal distribution with mean 68.7◦F and standard deviation 1.2◦F. Find the probability that, on a given day, the high temperature will be

(a) between 68.3 and 70.3◦F
(b) greater than 71.5◦F.

Q3: With reference to Q2, for which temperature is the probability 0.05 that it will be exceeded during one day?

Q4: If a random variable has the log-normal distribution with $\theta = -3$ and $\omega = 3$, find its mean and its standard deviation.

Q5: With reference to Q4, find the probabilities that the random variable will take on a value

a) less than 8.0;
b) between 4.5 and 6.5.

Q6: A wire-bonding process is said to be in control if the mean pull strength is 10 pounds. It is known that the pull-strength measurements are normally distributed with a standard deviation of 1.5 pounds. Periodic random samples of size 4 are taken from this process and the process is said to be "out of control" if a sample mean is less than 7.75 pounds. For a random sample, what is the probability that the process is deemed out of control?

Q7: If the distribution of scores of all students in an examination has a mean of 296 and a standard deviation of 14, what is the probability that the combined gross score of 49 randomly selected students is less than 14,250?