Statistics Assignment #5

1. The weekly output of a steel mill is a uniformly distributed random variable that lies between 110 and 175 metric tons.

  a. Compute the probability that the steel mill will produce more than 150 metric tons next week.
  b. Determine the probability that the steel mill will produce between 120 and 160 metric tons next week.

2. X is normally distributed with mean 300 and standard deviation 40. What value of X does only the top 15 % exceed?

3. The long-distance calls made by the employees of a company are normally distributed with a mean of 7.2 minutes and a standard deviation of 1.9 minutes. Find the probability that a call

  a. Last between 5 and 10 minutes
  b. Last more than 7 minutes
  c. Last less than 4 minutes

4. The service rate at a supermarket checkout is 6 customers per hour. If the service time is exponential, find the following probabilities:

  a. A service is completed in 5 minutes
  b. A customer leaves the counter more than 10 minutes after arriving
  c. A service is completed between 5 and 8 minutes.

5. Cars arrive randomly and independently to a tollbooth at an average of 360 cars per hour. Use the exponential distribution to find the probability:

  a. that the next car will not arrive within half a minute.
  b. What is the probability that no car will arrive within the next half minute?

6. Consumers spend an average of $21 per week in cash without being aware of where it goes (data extracted from" Snapshots: A Hole in Our Pockets," USA Today, January 18, 2010, p.1A). Assume that the amount of cash spent without being aware of where it goes is normally distributed and that the standard deviation is $5.

  a. What is the probability that a randomly selected person will spend more than $25?

b. What is the probability that a randomly selected person will spend between $10 and $20?

c. Between what two values will the middle 95% of the amounts of cash spent fall?

7. Customers arrive at the drive-up window of a fast-food restaurant at a rate of 2 per minute during the lunch hour.

a. What is the probability that the next customer will arrive within 1 minute?
b. What is the probability that the next customer will arrive within 5 minutes?
c. During the dinner time period, the arrival rate is 1 per minute. What are your answers to (a) and (b) for this period?

8. Suppose that the amount of time one spends in a bank is exponentially distributed with mean 10 minutes

a. What is the probability that a customer will spend more than 15 minutes in the bank?
b. What is the probability that a customer will spend more than 15 minutes in the bank given that he is still in the bank after 10 minutes?