$Q1$: A certain brand of flood lamps has a lifetime that is normally distributed with a mean of 3,750 hours and a standard deviation of 300 hours.

  a. What proportion of these lamps will last for more than 4,000 hours?

  b. What lifetime should the manufacturer advertise for these lamps in order that only 1% of the lamps will burn out before the advertised lifetime?

  c. If 10,000 lamps were randomly selected, how many lamps will survive between 3,150 and 4,350 hours?

$Q2$: Suppose that customers arrive at a drive through window at an average rate of three customers per minute and that their arrival follow the Poisson model.

  a. Write the probability density function of the distribution of the time that will elapse before the next customer arrives.

  b. Find the probability that the next customer will arrive within 1.5 minutes.

c. Find the probability that the next customer will not arrive within the next 2 minutes.

d. What is the expected time for the next customer to arrive at the window.?

$Q3$: The length of time patients must wait to see a doctor at an emergency room in a large hospital is uniformly distributed between 40 minutes and 3 hours.

a. What is the probability that a patient would have to wait between 50 minutes and two hours?

b. What is the probability that a patient would have to wait exactly one hour?

c. Find the variance of the waiting time.

With My Best Wishes