



Figure 7.5.9

Thus, using the normal approximation to the Poisson, the probability that at least 40 customers arrive in a given hour is 0.0418.

## 7.5 Exercises

### Basic Concepts

1. Why would you want to use the normal distribution to approximate a binomial distribution or a Poisson distribution?
2. What are the parameters of a normal distribution used to approximate a binomial distribution?
3. What are the parameters of a normal distribution used to approximate a Poisson distribution?
4. What is continuity correction? How does it improve the normal approximation to the binomial or Poisson?

### Exercises

5. Management at a small engineering company is considering the addition of a company cafeteria area. A random sample of 50 persons out of the total number of persons employed by the firm will be surveyed to see if they are in favor of the addition. Assume that the true percentage of persons that favor the addition is 90%.
  - a. Find the expected number of employees in the sample who will favor the addition of the cafeteria area.
  - b. Find the standard deviation of the number of employees in the sample who will favor the addition of the cafeteria area.
  - c. What is the probability that between 35 and 37 employees (inclusive) in the sample will favor the cafeteria?
  - d. What is the probability that more than 40 of the employees in the sample will favor the cafeteria?
  - e. What is the probability that at most 38 of the employees in the sample will favor the cafeteria?
6. The accounting department of a large corporation checks the addition of expense reports submitted by executives before paying them. Historically, they have found that 15% of the reports contain addition errors. An auditor randomly selects 60 expense reports and audits them for addition errors.
  - a. Find the expected number of reports in the sample that will have addition errors.



- c. Using the normal approximation to the Poisson, find the probability that the electric company receives at least 40 service calls in a 30-minute period.
  - d. Using the normal approximation to the Poisson, find the probability that the electric company receives at most 20 service calls in a 30-minute period.
  - e. Using the normal approximation to the Poisson, find the probability that the electric company receives between 25 and 50 (inclusive) service calls in a 30-minute period.
11. Patients arriving at the emergency room of a local hospital follow a Poisson distribution with an average arrival rate of 15 per half hour.
- a. Find the average number of patients that arrive at the emergency room in one hour.
  - b. Find the standard deviation of the number of patients that arrive at the emergency room in one hour.
  - c. Find the probability that at least 15 patients will arrive at the emergency room in one hour.
  - d. Find the probability that between 30 and 50 patients (inclusive) will arrive at the emergency room in one hour.
  - e. Find the probability that at most 35 patients will arrive at the emergency room in one hour.