

## **Waiting Lines and Queuing Theory Models**

**Use QM to solve the following problems:**

1. Customers arrive at an automated coffee vending machine at a rate of 4 per minute, following a Poisson distribution. The coffee machine dispenses a cup of coffee in exactly 10 seconds.
  - a) What is the average number of people waiting in line?
  - b) What is the average number in the system?
  - c) How long does the average person wait in line before receiving service?
  
2. Customers enter the waiting line at a cafeteria on a first-come, first-served basis. The arrival rate follows a Poisson distribution, and service times follow an exponential distribution. If the average number of arrivals is 6 per minute and the average service rate of a single server is 10 per minute, what is the average number of customers in the system?