

1. Consider a single-product inventory system in which customers asking for the product arrive according to a Poisson process with rate  $\lambda$ . Each customer asks for one unit of the product. Each demand which cannot be satisfied directly from stock on hand is lost. Opportunities to replenish the inventory occur according to a Poisson process with rate  $\mu$ . This process is assumed to be independent of the demand process. For technical reasons a replenishment can only be made when the inventory is zero. The inventory on hand is raised to the level 10 each time a replenishment is done.
  - (a) What is the long-run fraction of time the system is out of stock?
  - (b) What is the long-run fraction of demand that is lost?