

Assignment 4

1.

Machinists who work at a tool-and-die plant must check out tools from a tool center. An average of ten machinists per hour arrive seeking tools. At present, the tool center is staffed by a clerk who is paid \$6 per hour and who takes an average of 5 minutes to handle each request for tools. Since each machinist produces \$10 worth of goods per hour, each hour that a machinist spends at the tool center costs the company \$10. The company is deciding whether or not it is worthwhile to hire (at \$4 per hour) a helper for the clerk. If the helper is hired, the clerk will take an average of only 4 minutes to process requests for tools. Assume that service and interarrival times are exponential. Should the helper be hired?

2.

Visitors' parking at Ozark College is limited to five spaces only. Cars making use of this space arrive according to a Poisson distribution at the rate of six cars per hour. Parking time is exponentially distributed with a mean of 30 minutes. Visitors who cannot find an empty space on arrival may temporarily wait inside the lot until a parked car leaves. That temporary space can hold only three cars. Other cars that cannot park or find a temporary waiting space must go elsewhere. Determine the following:

- (a) The probability, p_n , of n cars in the system.
- (b) The effective arrival rate for cars that actually use the lot.
- (c) The average number of cars in the lot.
- (d) The average time a car waits for a parking space inside the lot.
- (e) The average number of *occupied* parking spaces.
- (f) The average utilization of the parking lot.