已知顾客到来过程为 Possion 分布，平均 4 人/h, $\lambda = 4$
修理时间服从负指数分布, 平均需要 6min, $\mu = 10$
(1) 求修理店空闲的概率

$$\rho = \frac{\lambda}{\mu} = 0.4$$
$$p_0 = (sum_{n=0}^{\infty}\rho^n)^{-1} = \left(\frac{1}{\rho}\right)^{-1} = 1 - \rho = 0.6$$

(2) 店内恰有 3 个顾客的概率

$$p_3 = \rho^3 p_0 = 0.4^3 \times 0.6 = 0.0384$$

(3) 店内至少有一个顾客的概率

$$P(\text{至少有一个顾客}) = \sum_{n=1}^{\infty} p_n = 1 - p_0 = 0.4$$

(4) 店内平均顾客数

$$L_s = \frac{\lambda}{\mu - \lambda} = \frac{4}{10 - 4} = \frac{2}{3}$$

(5) 每位顾客在店内平均逗留的时间

$$W_s = \frac{1}{\mu - \lambda} = \frac{1}{10 - 4} = \frac{1}{6}$$

(6) 等待服务的平均顾客数

$$L_q = \frac{\lambda^2}{\mu \times (\mu - \lambda)} = \frac{4^2}{10 \times (10 - 4)} = \frac{4}{15}$$

(7) 每位顾客平均等待服务时间

$$W_q = \frac{\lambda}{\mu(\mu - \lambda)} = \frac{4}{10 \times (10 - 4)} = \frac{1}{15}$$