Practice

1. 75 ms = .075 s

$10 \times .075 = .75$

$\rho = .75$

2.
$$\begin{array}{r} 1.00 \\ -\ .75 \\ \hline .25 \end{array}$$

3.
$$\frac{.075}{1 - .75} \qquad \bar{R} = .3$$

4.
$$.3 - .075 \qquad \bar{W} = .225$$

⑤ $\frac{.75}{1-.75}$ $\bar{Q} = 3$

⑥ $\bar{Q} = 3$

⑦ $\bar{Q} - P$

$3 - .75 = 2.25$

⑧ $\bar{Q} - P$

$3 - .75 = 2.25$

(9)

10 .10

$\bar{R} = \frac{S}{1-P}$

$\bar{R} = \frac{S}{1-(\lambda \cdot S)}$

$\bar{R} = \frac{S}{1-(10 \cdot S)}$

$.1 = \frac{S}{1-(10 \cdot S)}$

$S = 0.1(1-10S)$

$S = 0.1 - 1S$

$2S = 0.1$

$S = .05$

10

$\bar{Q} = \frac{\rho}{1-\rho}$ $\quad s = .0\bar{6}$

$2 = \frac{\rho}{1-\rho}$

$2 \approx \frac{.\bar{6}}{1-.\bar{6}}$

$s = \frac{\rho}{\lambda}$

$s = \frac{.\bar{6}}{10}$

Real Ultimate Power

Single queue @ full power

$$\rho = \frac{\lambda}{\mu} \qquad \bar{S} = \frac{1}{\mu} \qquad \bar{R} = \frac{\bar{S}}{1-\rho}$$

$$\bar{R} = \frac{1/\mu}{1-\frac{\lambda}{\mu}}$$

Multiple queues @ 1/k power

$$\rho = \frac{\lambda}{\mu} \qquad \bar{S} = \frac{k}{\mu} \qquad \bar{R} = \frac{\bar{S}}{1-\rho}$$

$$\bar{R} = \frac{k/\mu}{1-\frac{\lambda}{\mu}}$$

If $k=1$ they'd be equal. If $k>1$, the single queue at full power will have lower residency time.