Solution for exercise 30, exercise 1 final exam 8/1-1994

Question 1  This is the probability that an exponential distribution exceeds the value 1, i.e. $e^{-1}$.

Question 2

$$\frac{\mu}{\mu + \lambda} = 0.9 \Rightarrow \mu = 9$$

Question 3

$$\begin{bmatrix}
-1 & 1 & 0 \\
9 & -10 & 1 \\
0 & 0 & 0
\end{bmatrix}$$

Question 4  The distribution is a phase type distribution. The exact expression can be found by applying the Laplace transform.

$$(sI - T)^{-1} = \left( \begin{bmatrix} s + 1 & -1 \\ -9 & s + 10 \end{bmatrix} \right)^{-1}$$

The Laplace transform is then obtained by

$$\begin{bmatrix} 1, 0 \end{bmatrix} \frac{1}{s^2 + 11s + 1} \begin{bmatrix} 0 \\ 1 \end{bmatrix} =$$

By decomposition and inversion of the transform we finally obtain the probability in question which is 0.92.