

1.

$$e^{-\lambda} = 1 - 0.2 = 0.8$$

$$1 - \sum_{i=0}^2 e^{-\lambda} \frac{\lambda^i}{i!} = 0.00157$$

2.

$$\begin{aligned} E[X] &= E[X|Y = 0] \cdot P(Y = 0) + E[X|Y > 0] \cdot P(Y > 0) \\ &= E[Y \cdot 8000|Y = 0] \cdot P(Y = 0) + E[(Y - 1) \cdot 8000|Y > 0] \cdot (1 - P(Y = 0)) \\ &= 8000E[Y|Y = 0] \cdot P(Y = 0) + (8000E[Y|Y > 0] - 8000) \cdot (1 - P(Y = 0)) \\ &= 8000 \cdot E[Y] - 8000 \cdot (1 - P(Y = 0)) \\ &= 8000 \cdot 4 - 8000 \cdot (1 - e^{-4}) \\ &= 24146.525 \end{aligned}$$

3.