② $P_0(5) = 0.05$

$$P_m(t) = \frac{(\lambda t)^m e^{-\lambda t}}{m!}$$

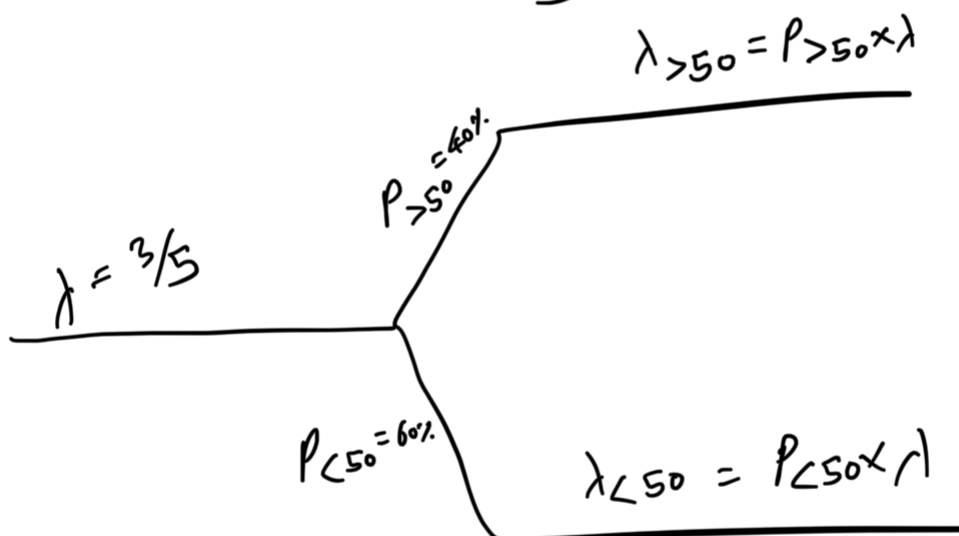$$P_0(5) = \frac{(\lambda \times 5)^0 e^{-\lambda \times 5}}{0!}$$

$$= e^{-5\lambda} = 0.05$$

$\Rightarrow \quad -5\lambda = \ln 0.05$

$\Rightarrow \quad 5\lambda = 3$

$\Rightarrow \quad \lambda = \frac{3}{5}$

$\lambda = \frac{3}{5}$

$P_{>50} = 40\%$

$\lambda_{>50} = P_{>50} \times \lambda$

$P_{<50} = 60\%$

$\lambda_{<50} = P_{<50} \times \lambda$

$$P_4(t) = \frac{(\lambda_{>50}\, t)^m \, e^{-\lambda_{>50}\, t}}{m!}$$

$$= \frac{\left(\frac{4}{10} \times \frac{3}{5} \times 20\right)^4 \, e^{-\left(\frac{4}{10} \times \frac{3}{5} \times 20\right)}}{4!}$$

$$= \frac{(24/5)^4 \, e^{-(24/5)}}{4!}$$

$$= \quad 0.182$$