2nd exercises for SIM'2021

Ex. 1
a) Derive log-likelihood function for model where $Y_1, \ldots, Y_n$ are i.i.d and follow Poisson distribution $\mathcal{P}(\lambda)$.
b) Make figure of $\mathrm{l}(\lambda)$ in cases where (i) $n = 10$ and $\overline{y} = 5$, (ii) $n = 20$ and $\overline{y} = 6$.

Ex. 2
a) Formulate maximum likelihood equations for n i.i.d observations from Poisson distribution.
b) Derive the maximum likelihood estimate for parameter λ from ML equations

Ex. 3
a) Show that mean $\overline{y}$ is the MLE for μ when Y_i are i.i.d and follow $\mathcal{N}(\mu, 1)$.
b) Make figure of $\mathrm{l}(\mu)$ when $\overline{y} = 5$ and (i) $n = 15$, (ii) $n = 30$.

Ex. 4
We have 10 observations from i.i.d. Poisson model and $\overline{y} = 2.7$. Construct 95 % confidence interval for λ using asymptotic result in Eq. (2.7).