2. a) $Y = \sum_{i=1}^{n} Y_i$, Poisson (n, μ)

$$P(y) = \frac{e^{-\mu} \mu^{y}}{\sum Y_i!}$$

$$\ell[P(Y)] = \frac{e^{-\mu} \mu^{\sum_{i=1} Y_i}}{\sum Y_i!}$$

$$\log[\ell(P(Y))] = L(Y) = -\mu + \sum_{i=1} y_i \ln(\mu) - \ln(\sum y_i!)$$

b) $\hat{\mu} = \bar{Y} = Y/n$

$$\log(\ell(P(Y)))' = -1 + \frac{\sum_{i=1}^{n} y_i}{\mu} \rightarrow \frac{\sum_{i=1}^{n} y_i}{\mu} = 1$$

$$\Rightarrow \sum_{i=1}^{n} y_i = \mu$$

$$\Rightarrow \bar{Y} = \frac{Y}{n}$$

c) $E(x) = var(x) = \mu$

$$var(\hat{\mu}) = var(Y/n) = \frac{\mu}{n^2}$$

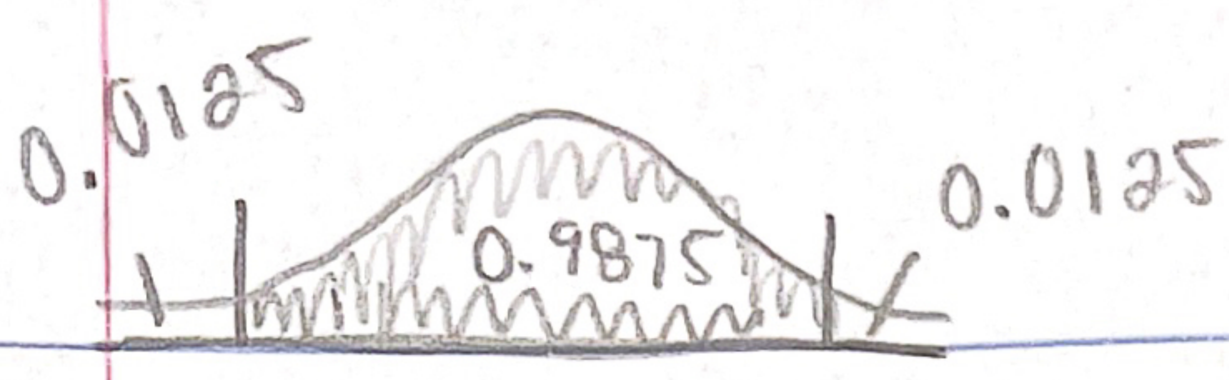
d) $I(\hat{\mu}) = E_\mu(-\frac{\partial^2}{\partial \mu^2} \ln f(Y|\mu)) = E_\mu(\frac{Y}{\mu^2}) = \frac{\mu}{\mu^2} = \frac{1}{\mu}$

$$nI(\hat{\mu}) = \frac{n}{\mu}$$

No, they are not the same.

e) Mean $= (3+6+3+3+5+4+6+9+3+3)/10 = 4.5$

$$Z_w = \frac{4.5 - 3}{0.671} = \frac{1.5}{0.671} \qquad SE = \frac{\sqrt{4.5}}{\sqrt{10}} = 0.671$$



Z score = 0.9875

$\boxed{\text{Answer: } 0.025}$