2019 Stat 231 Quiz 2 VB.

Date: June 20, 2019.
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Q1 MC

a) A → range of x. , all B, C, D : $x \geq 0$

b) B
$$L(\theta) = \prod_{i=1}^{n} f(y_i;\theta) = \prod_{i=1}^{n} \frac{\theta^{y_i} e^{-\theta}}{y_i!} = \frac{\theta^{\Sigma y_i} e^{-n\theta}}{\prod_{i=1} y_i!}$$

so, $$R(x) = \frac{L(x)}{L(\hat\theta)} = \frac{\dfrac{x^{\Sigma y_i} e^{-nx}}{\cancel{\pi y_i}}}{\dfrac{\hat\theta^{\Sigma y_i} e^{-n\hat\theta}}{\cancel{\pi y_i}}}$$

$$= \left(\frac{x}{\hat\theta}\right)^{\Sigma y_i} e^{n(\hat\theta - x)} \qquad [\ \Sigma y_i = n\bar{y} = n\hat\theta\ ]$$

$$= (x/\hat\theta)^{n\hat\theta} e^{n(\hat\theta - x)} = e^{n\hat\theta \log(x/\hat\theta)} e^{n(\hat\theta - x)}$$

$$= \exp(n\hat\theta \log(x/\hat\theta) + n(\hat\theta - x))$$

□

c) A always round up!

d) C CLT → always APPROXIMATE
not Exactly.

$$\begin{cases} E[\bar{Y}] = \mu = E[Y_i] \\ V(\bar{Y}) = \sigma^2/n = V(Y_i)/n \end{cases}$$

e) B

f) A

$$\boxed{\text{CI: } \begin{cases} \text{for } \mu \to \bar{y} \pm z_{(crt)}\ \sigma/\sqrt{n} \\ \text{for } p\ (\text{prop}) \to \hat{p} \pm z_{(crt)} \sqrt{\dfrac{\hat p(1-\hat p)}{n}} \end{cases}}$$