Exercise b. 11.

(1) $f(x|a,b) = \frac{b^a}{f(a)} x^{a+e^{-bx}}, x>0$ $(ogf(x|a,b) = log \left[\frac{b^a}{f(a)} x^{a+e^{-bx}} \right]$ = 2log b - log f(a) + (a-1)log x - b x = 2log b - g(a) + (a-1)log x - b x $3 = \frac{2}{2a} log f(x|a,b) |_{a=a_0}$ $= log b - g'(a) + log x |_{a=a_0}$ = log b - g'(a) + log x $E[5] = log b - g'(a_0) + log x$ $E[5] = log b - g'(a_0) + log x$ = -g''(a) $H(a|b) = \frac{2}{2a} [log b - g'(a_0) + log x]$ = -g''(a) $H(a + b) = -g''(a_0)$ $f' = -H(a_0) = g''(a_0)$

(b): $\sqrt{n}(\hat{a}-a) \xrightarrow{d} N(o, g^{-1}) = N(o, \frac{1}{g'(a_0)})$ (c): \hat{v}_0 : $H(a_0|b)$ is not an explicit Sunction of a_0 . \hat{v}_i : $\ln(a) = \sum_{i=1}^{n} \left[a_0 b_0 \beta - g(a) + (a_0 - 1) \log \pi i - |b \pi|\right]$ $Sn(\hat{a}) = \sum_{i=1}^{n} \left[a_0 \beta - g'(a) + (og \pi)\right]$ $Sn(\hat{a}) = \sum_{i=1}^{n} \left[a_0 \beta - ng'(\hat{a}) + \sum_{i=1}^{n} a_0 \beta - ng'(\hat{a})\right]$ $g'(\hat{a}) = \frac{n \log b + \sum_{i=1}^{n} a_0 \beta \pi}{n}$

140)=9(0) g(0) = 697(0). E[X] = 20 Var[x] = 20 Frencise 10.14.

En(p)= \$\frac{1}{2}\$ [alog p -g(2) + (2-1) log 9i - p 1/2] $\mathcal{G}_{n}(\beta) = \frac{\partial \mathcal{G}_{n}(\beta|a)}{\partial \beta} = \frac{2}{2\pi} \left[\frac{\partial}{\partial \beta} - \eta_{i} \right]$ Sn(B)= 1 - 1x=0 $\hat{\vec{b}} = \frac{\vec{a}}{\vec{x}} \quad (Same as \hat{\vec{b}}_{MM}!).$ (ogf(x) a, p) = a(ogp - g(a) + (danlogx - px 5 = = ogf(x) a(b) | p-po = 30 - X B=Bo = \frac{1}{\beta_0} - \times \frac{1}{\beta_0} - \times \frac{1}{\beta_0} \frac{1}{\beta_0} - \frac{1}{\beta_0} \frac{1} $H(\beta_0) = -\frac{\partial 0}{\beta_0^3} \Rightarrow \mathcal{G} = \frac{\partial 0}{\beta_0^3}$ The B- B) d>N(0. 10).