$f(x|\theta) = \theta x^{\theta-1}$

b) $L(\theta|x) = \prod_1^n \theta x_i^{\theta-1}$

$l(\theta|x) = n\ln\theta + \sum_1^n \ln(x_i^{\theta-1})$

$= n\ln + (\theta-1)\sum_1^n \ln(x_i)$

$\frac{\partial}{\partial\theta} l(\theta|x) = \frac{n}{\theta} + \sum_1^n \ln(x_i)$

$0 = \frac{n}{\theta} + \sum_1^n \ln(x_i)$

$-\sum \ln(x_i) = \frac{n}{\theta} \qquad -\theta\sum\ln(x_i) = n$

c) $\boxed{\theta = \frac{-n}{\sum \ln(x_i)}}$

$\frac{\partial}{\partial\theta}\left(\frac{n}{\theta}\right) + \sum_1^n \ln(x_i) = \frac{-n}{\theta^2} < 0$ max

d) $\lim_{\theta\to 0} \theta x^{\theta-1} = 0x^{(0)-1} = \boxed{0}$ negative everywhere bc $\theta, n > 0$

$\lim_{\theta\to\infty} \theta x^{\theta-1} = \infty(x)^{\infty-1} = \infty$