

1.

a) $g(x) = \exp(x)$

$$h(y) = \log(y)$$

$$h'(y) = \frac{1}{y}$$

$$p_Y(y) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(\log(y) - \mu)^2}{2\sigma^2}} \left(\frac{1}{y}\right)$$

$$= \frac{1}{y\sqrt{2\pi\sigma^2}} e^{-\frac{(\log(y) - \mu)^2}{2\sigma^2}}$$

b) $\theta = \log \frac{\theta}{1-\theta}$

$$h(\theta) = \frac{e(-\theta)}{e(-\theta)+1} = \frac{1}{1+e(-\theta)}$$

$$h'(\theta) = \frac{e^x}{(e^x+1)^2}$$

$$f_{\theta}(\theta) = h(\theta) |h'(\theta)|$$

$$= \frac{e(-\theta)}{(e(-\theta)+1)^2} \cdot 1$$

$$= \frac{e(-\theta)}{(e(-\theta)+1)^2}$$

2.

b) $p(y|\theta)p(\theta) = \prod_{i=1}^n \frac{1}{\theta} \frac{kb^k}{\theta^{k+1}}$

$$= \frac{k^n b^n}{\theta^{k(n+1)}}$$

$$\propto \frac{1}{\theta^{k(n+1)}}$$

Let $\theta = c$

Pareto $(c, k(n+1))$