1a) First of all, likelihood function is specified.

$$\frac{1}{(a \mid X)} = \frac{1}{\sqrt{(a \mid X)}} \frac{1}{a(1-x)} \frac{1}{a(1-x)}$$

 $L(a|X) = \prod_{i=1}^{n} a(1-x_i)^{q-1}$

Then converted to log (In) likevishood function. Because the log-likelihood function simplifies by turning products into sums.

turning products into sums.

$$L(a|X) = \log \frac{n}{X} a(1-x_i)^{\alpha-1}$$

$$= \sum_{i=1}^{n} (\log a) + (a-1) \log (1-x_i)$$
For MLE we differentiate the log likelihood function

with respect to a and set it equal to 0. $\frac{d}{dn} \left[n \log a + (a-1) \sum_{i=1}^{n} \log (1-x_i) \right]$

$$\frac{d}{da} \left[n \log a + (a-1) \sum_{i=1}^{\infty} \log (1-x_i) \right]$$
= $\frac{1}{2} \log (1-x_i) + \frac{1}{2} \log (1-x_i)$

$$= \sum_{i=1}^{n} \log (1-x_i) + \frac{n}{q}$$

$$\frac{-2}{i=1}\log(1-x_i) + \frac{\pi}{q}$$

$$Q = \frac{-n}{\sum_{i=1}^{n} \log(1-x_i)}$$

Derivative of log posterior

 $\alpha = \frac{n + \lambda - 1}{\lambda - \sum_{i=1}^{n} \log (1 - x_i)}$

 $= \frac{n}{n} + \sum_{i=1}^{n} \log (1-x_i) + \frac{x-1}{n} - x$

 $\frac{n}{\alpha} + \sum_{i=1}^{n} \log (1-x_i) + \frac{\lambda-1}{\alpha} = \lambda = 0$

p(a) =
$$\lambda$$
. a . e likelihood prior function

$$p(a) = \lambda \cdot a^{-1} \cdot e^{-\lambda a}$$

$$\log L(a) = \sum_{i=1}^{n} \log \left[a (1-x_i)^{a-1} \right]$$

$$la) = \sum_{i=1}^{n} log \left[a \left(1 - x_i \right)^{a-1} \right]$$

$$a) = log \left[\lambda . a^{\lambda-1} . e^{-\lambda a} \right]$$

$$|a| = \sum_{i=1}^{n} \log \left[a \left(1 - x_i \right)^{\alpha - 1} \right]$$

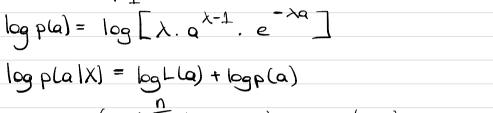
$$|a| = \log \left[\lambda \cdot a^{\lambda - 1} \cdot e^{-\lambda \alpha} \right]$$

$$|a|X| = \log L(\alpha) + \log \rho(\alpha)$$

$$a) = \log \left[\lambda \cdot a^{\lambda-1} \cdot e^{-\lambda a} \right]$$

$$a(X) = \log L(a) + \log p(a)$$

(=1)
$\log p(a) = \log \left[\lambda \cdot a^{\lambda-1} \cdot e^{-\lambda a} \right]$
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log pla IX) = log Lla) + log pla)
= $\log \alpha + (\alpha - 1) \stackrel{n}{\underset{i=1}{\sum}} \log (1 - x_i) + \log \lambda + (\lambda - 1) \log \alpha$
$-\lambda \alpha$



$$1 = \log \left[\lambda \cdot a^{\chi-1} \cdot e^{-\lambda a} \right]$$

$$a[\chi] = \log L(a) + \log p(a)$$

$$a) = \log \left[\lambda \cdot a^{\lambda-1} \cdot e^{-\lambda a} \right]$$

$$(a \mid X) = \log L(a) + \log p(a)$$