$$= \sum_{w \in Q \cap D} c(w,Q) \log\left[1 + \frac{(1-\lambda)\, c(w,D)}{\lambda\, p(w|REF)\,|D|}\right]$$

$$+ \underbrace{\sum_{w \in Q} c(w,q) \log\left[\lambda\, p(w|REF)\right]}_{\text{independent of document}}$$

$$\propto \sum_{w \in Q \cap D} c(w,Q) \log\left[1 + \frac{(1-\lambda)\, c(w,D)}{\lambda\, p(w|REF)\,|D|}\right]$$

(b) $q = (w_{1,q}, w_{2,q} \cdots w_{n,q})$

if word in query then $w_{i,q} = 1$, else $w_{i,q} = 0$

$d = (w_{1,d}, w_{2,d} \cdots w_{t,d})$

if word in doc then $w_{j,d} = 1$, else $w_{j,d} = 0$.

Weight $w_{t,d} = \log\left[1 + \frac{(1-\lambda)\, c(w,D)}{\lambda\, p(w|REF) \times |D|}\right]$ This captures TF & IDF with $c(w,D)$ and $p(w|REF)$