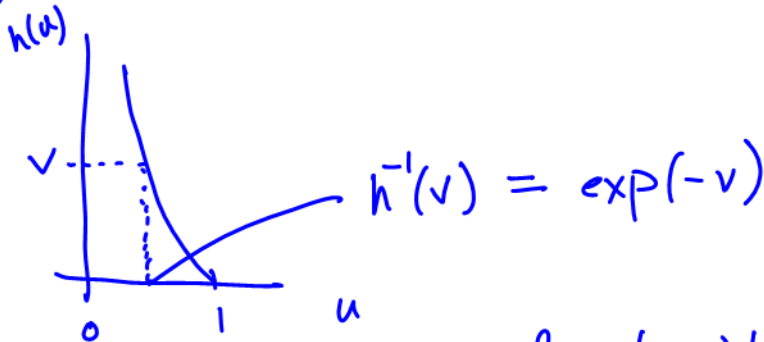


## Stat 342 Example 8

Suppose that  $U \sim U(0,1)$ . Consider  $V = -\ln U$ .  
(This is  $h(U)$  for  $h(u) = -\ln(u)$  and we're going to find the distribution of  $h(U)$ .) Note that roughly  $h(u)$  looks like:



So for  $v > 0$  the cdf of  $V$  is

$$\begin{aligned} F(v) &= P[V \leq v] = P[U \geq h^{-1}(v)] = P[U > \exp(-v)] \\ &= 1 - \exp(-v) \end{aligned}$$

By inspection, this is the cdf of the  $\text{Exp}(1)$  dsn.

Note then that

$$f(v) = \frac{d}{dv} (1 - \exp(-v)) = \exp(-v) \quad \text{for } v > 0$$

( $f(v) = 0$  for  $v < 0$ ).