BAYESIAN INFERENCE FOR
p = probability of a human being left-handed
BASED ON OUR CLASS 4 DATA SET

$$n = 35$$

$$\sum_{i=1}^{n} X_i = 4$$

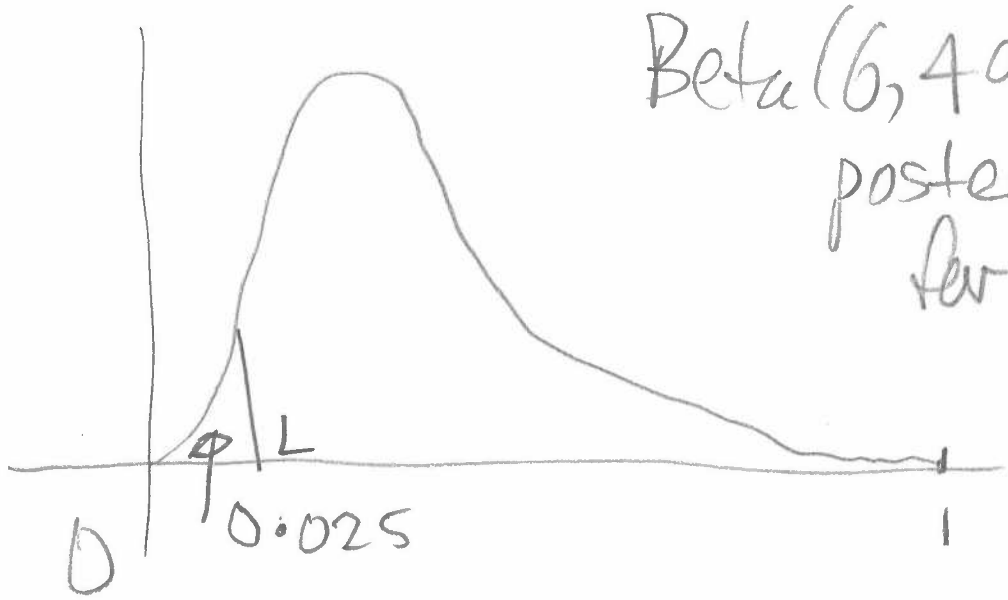
$$Beta\left(2+\sum_{i=1}^{n} X_i,\ 18+n-\sum_{i=1}^{n} X_i\right)$$

$$= Beta(6, 49)$$

$$\hat{p}_{Bayes} = \frac{6}{6+49} = \frac{6}{55}$$

$$\simeq 0.1091$$

$$\hat{p}_{Freq} = \frac{4}{35} \simeq 0.1143$$



$$0.025 = P(0 < p < L \mid x_1, \ldots, x_n)$$

$$= \int_0^L (\text{the Beta}(6,49) \text{ density } f^n)\, dp$$

$$= \int_0^L c\, p^5 (1-p)^{48}\, dp$$

$$0.025 = F(L; 6, 49)$$

where F is cumulative distrib^n funct^n of Beta(6,49)

$$L = F^{-1}(0.025; 6, 49) = Q(0.025; 6, 49)$$

$= \text{qbeta}(0.025, 6, 49)$

$=$ Quantile fⁿ of
Beta$(6, 49)$

$= 0.0419$

$U = 0.2030$

$\Rightarrow$ 95% credible interval for p

is $(0.0419, 0.2030)$