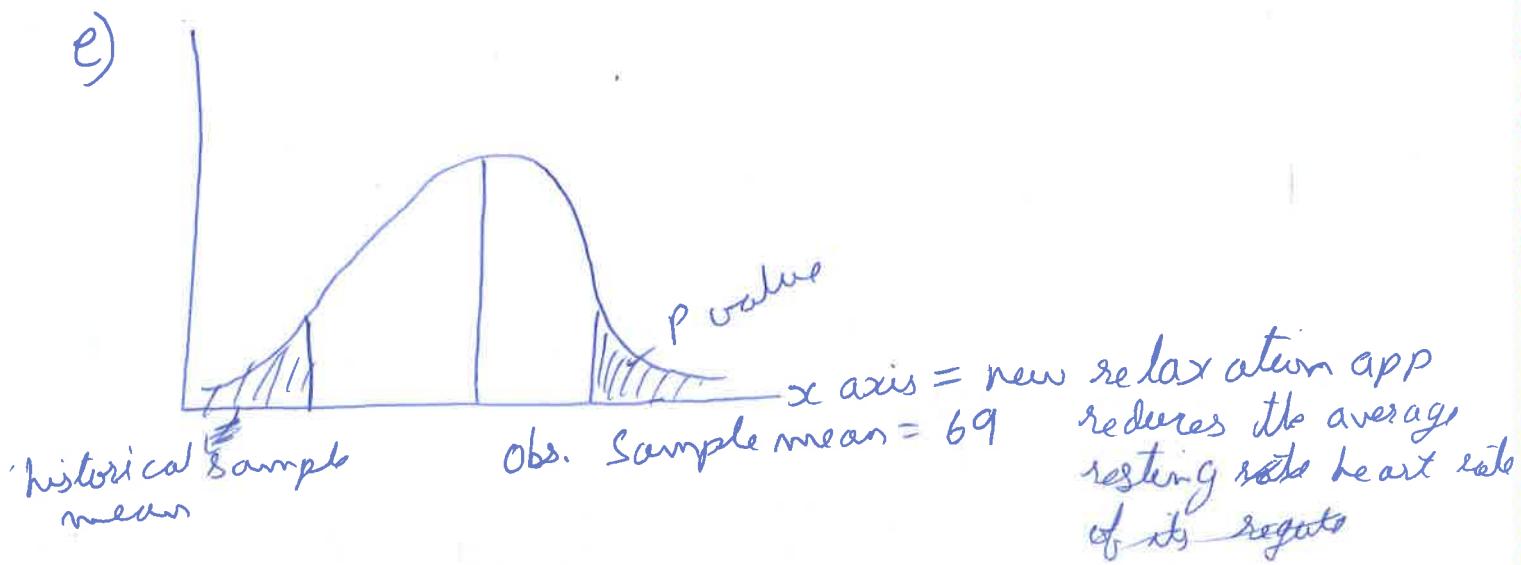


- Q1) a) Population mean is 72 bpm and the Sample mean is, 64, 64 regular users of the app.
- b) null Hypothesis (H_0):- New relaxation app does not reduces the average resting heart rate of its regular users.
- Alternative Hypothesis (H_1): New relaxation app reduces the average resting heart rate of its regular users.
- c) Standard error is $\frac{10}{\sqrt{64}}$
Standard error is the standard deviation mean.
- d) $Z = \frac{\bar{x} - \mu}{SE} = \frac{69 - 72}{\frac{10}{\sqrt{64}}} = \frac{-3}{\frac{10}{8}} = \frac{-3}{1.25} = -2.4$



$$Q2) P(A|B) = P(A) \times \frac{P(B|A)}{P(B)}$$

$$P(B) = P(B|A)P(A) + P(B|A^c)P(A^c)$$

$$P(A) = 20\% (0.2) P(A^c) = 80\% (0.8)$$

$$P(B|A) = 0.9 \quad P(B|A^c) = 0.05$$

a) Prior probability is 0.2 ~~or 20%~~ and $P(A)$ is the prior probability.

b) Posterior probability is $P(A|B)$. Posterior probability, the final updated evidence of the probability or it is the probability of spam given marked vs spam.

$$\begin{aligned} c) P(A|B) &= P(A) \times \frac{P(B|A)}{P(B)} \\ &= 0.2 \times \frac{0.9}{P(B)} = 0.2 \times \frac{0.9}{0.22} \end{aligned}$$

$$P(B) = 0.9 \times 0.2 + 0.05 \times 0.8$$

$$P(B) = 0.18 + 0.04 = 0.22$$

d) Yes the NO, the posterior probability will not be higher than the prior. It will be lower than the posterior will be ~~higher~~ than prior. Because prior is ~~high~~ while we update the probability by the evidence.

d) The posterior probability will be higher than prior, as we update the initial probability with evidence.