S. Thanmayee
AV25UG049

Q1

a) Population mean = 72 bpm

Sample mean = 69 bpm

b) Ho : Ru bpm $\geq$ Np (Relaxation app users have greater/equal bpm rate than Normal People).

H1 : Ru bpm $<$ Np (Relaxation app users have less bpm rate than Normal people.)

c) d = 72 - 69 = 3

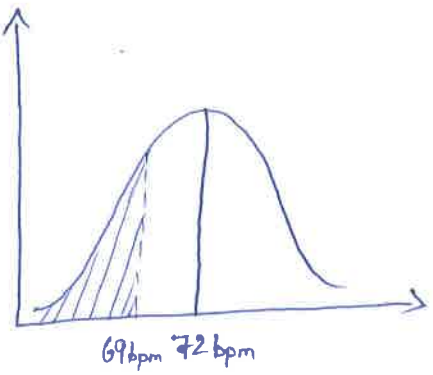
Given, Standard deviation = 10bpm

$$Se = \frac{\sigma}{\sqrt{n}} = \frac{10}{\sqrt{64}} = \frac{10}{8} = \underline{\underline{1.25}}$$

Standard error - The distance b/w the population & sample means.

d) $$Z = \frac{d}{Se} = \frac{3}{1.25}$$

e)



Q2 Given, P(M) = 20%

P(H∩S) = 90%

P(H∩~S) = 5%

a) The probability of prion in the above equation is,

$$P(A) = \frac{P(A/B) \cdot P(B)}{P(B/A)} \Rightarrow \frac{P(A)B) \cdot P(B/A) \cdot P(A) + P(B/A^c) \cdot P(A^c)}{P(B/A)}$$

The prior probability based on the example above is 20%.

b) The posterior probability in the above equation is,

$$P(A/B) = \frac{P(B/A)\,P(A)}{P(B/A).P(A) + P(B/A^c)\,P(A^c)} = \frac{P(B/A)\,P(A)}{P(B \cap A) + P(B \cap \sim A)}$$

Posterior = Probability of spam Message marked as spam.

c) $$P(A/B) = \frac{90 \times 20}{90 \times 20 + 5 \times 80} = \frac{1800}{1800 + 400} = \frac{1800}{2200} = \frac{9}{11} = 0.81$$

d) The probability of posterior will be lower than the prior.

Justification:- As the probability of getting messages is itself low.