K. Jyoshna
AU25UG026

Q1.

a) Population mean is 72 bpm

Sample mean is 69 bpm

b) Null hypothesis (Ho): New relaxation app does not reduces the average heart resting rate

Alternative hypothesis(H_1): New relaxation app will reduces the average resting heart rate.

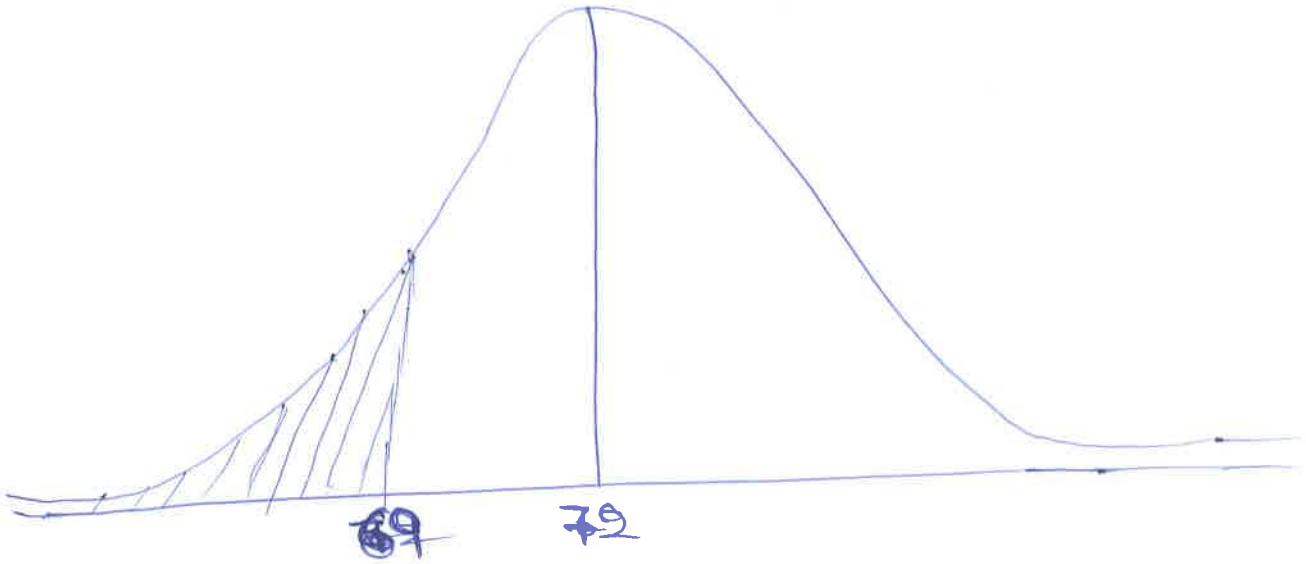
c) Standard error $= \frac{\sigma}{\sqrt{n}} \Rightarrow \frac{72}{\sqrt{64}} \Rightarrow \frac{72}{8} \Rightarrow 9$

Standard error means population mean divided by root of sample size.

d) Z-Score $\Rightarrow \frac{x-\mu}{SE} \Rightarrow$

$\Rightarrow \frac{69-72}{9} \Rightarrow \frac{-3}{9} \Rightarrow -\frac{1}{3} \Rightarrow 0.3$

e)



Q2.

$P(A) = 20\% = 0.2$ $P(A^c) = 100 - 20 = 80\% = 0.8$

$P(B/A) = 90\% = 0.9$

$P(B/A^c) = 5\% = 0.05$

a) The prior probability in the above equation is $P(A)$.
The prior probability based on the example is $P(A) = 0.2$

b) In the equation $P(A/B)$ is the posterior probability.
In the above example the posterior probability is spam message is marked as spam by the filter.

c) $P(B/A)P(A) + P(B/A^c)P(A^c)$ is the expression from the equation that gives total probability.

$$P(A/B) = 0.2 \frac{0.9}{(0.9)(0.2) + (0.05)(0.8)}$$

d) The posterior probability will become higher once we update the prior. So, in the above equation it will be higher.