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Q1

a) population mean = 72 bpm & Sample mean = 69 bpm.

b) Null hypothesis : Relaxation app doesn't reduce the avg resting heart rate ($H_0 : \mu_{with\ app} \geq \mu_{without\ app}$)

Alternative hypothesis : Relaxation app reduces avg resting heart rate ($H_1 : \mu_{with\ app} < \mu_{without\ app}$)

c) $SE = \frac{\sigma}{\sqrt{n}}$

$= \frac{10}{\sqrt{64}} = \frac{10}{8}$

$SE = 0.8$

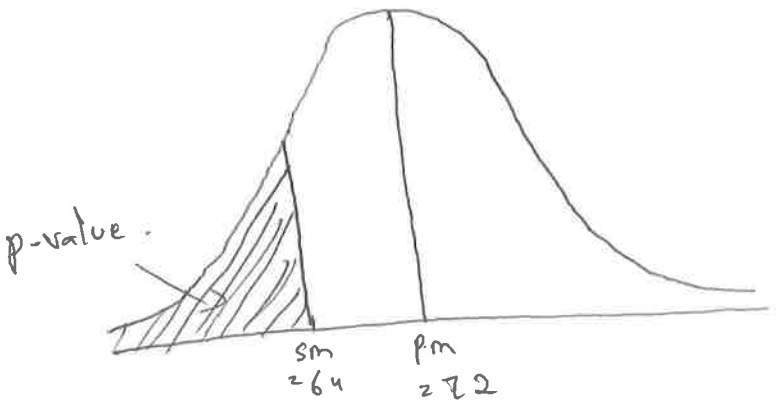
It is the standard deviation of the sample mean.

d) $Z = \frac{x - \mu}{SE}$ $\quad x = 64,\ \mu = 72,\ SE = 0.8$

$Z = \frac{64 - 72}{0.8} = \frac{8}{0.8}$

$Z = 0.1$

e)



$P(S) = 0.2$

~~$P(SM \mid SM) = 0.9$~~

~~$P(S \mid SM) = 0.05$~~

~~$P(SM \mid S) =$~~

$P(SM \mid S) = 0.9$

$P(SM \mid -S) = 0.05$

$P(S \mid SM) =$

Q2.

a) It is the initial belived probability, in the eqv "P(A)". It is the P(S) = 0.2 from ex.

b) The porterior probability is the updated probability after multiplying the prior with the evidence factor. In the eqv it is "P(A/B)". In the ex. it is the probability of spam given it is marked as "Spam". P(S/SM) =

c) $P(B) = P(B/A)\,P(A) + P(B/\sim A)\,P(\sim A)$

In example :-

$$P(SM) = P(SM/S)\,P(S) + P(SM/\sim S)\,P(\sim S)$$

$$= 0.9 \cdot 0.2 + 0.05 \cdot 0.8$$

$$= 0.18$$

d) The posterior probability will be higher because the evidence factor will be greater than 1.