

$$\begin{array}{r}
 81 \text{ } 1.25 \\
 8 \\
 \hline
 70 \\
 40 \\
 \hline
 20 \\
 1.25 \\
 \hline
 10.00
 \end{array}$$

$$\begin{array}{r}
 1.25 \rightarrow 3.0(2.5) \\
 2.5 \\
 \hline
 0.50
 \end{array}$$

Q.1

a) population mean = 72 bpm
sample mean = 69 bpm

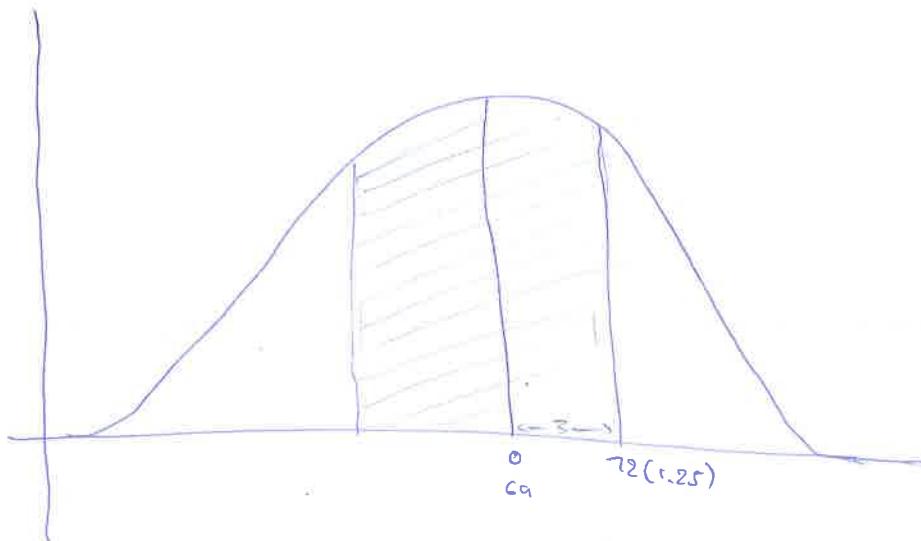
b) $H_0 \rightarrow \mu \leq 69$ bpm
 $H_1 \rightarrow \mu > 69$ bpm

c) Distance in terms of standard errors

$$S.E = \frac{\sigma}{\sqrt{n}} = \frac{10}{\sqrt{64}} = \frac{10}{8} = 1.25$$

d) Z-score = $\frac{72 - 69}{1.25} = \frac{3}{1.25} = 2.4$

e)

Q.2

a) $P(S) = 20\% = 0.2$

Probability of all incoming messages are spam $P(A)$ (prior).

b) $P(A|B)$ is the posterior, Posterior is the updated probability after getting evidence.

$$\begin{array}{r}
 0.09 + 0.0475 \\
 0.9 \times 0.1 + 0.05 \times 0.95
 \end{array}$$

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

$$(0.9)(0.1) + (0.05)(0.95) = 0.13$$

$$\begin{array}{r}
 0.9 \\
 0.1 \\
 \hline
 0.9 \\
 0.09 \\
 \hline
 0.99 \\
 0.05 \\
 \hline
 0.05 \\
 0.05 \\
 \hline
 0.13
 \end{array}$$

d) The posterior probability will be high, because it is the updated probability after getting evidence, it will be finalized.

