Q1.

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a). population mean = 72 bpm

Sample mean = 69 bpm

b). H_1 : $\mu_{new} < \mu_{old}$

H_0 : $\mu_{new} \geq \mu_{old}$

c). Standard error : The distance between sample mean & base line in terms of standard error.

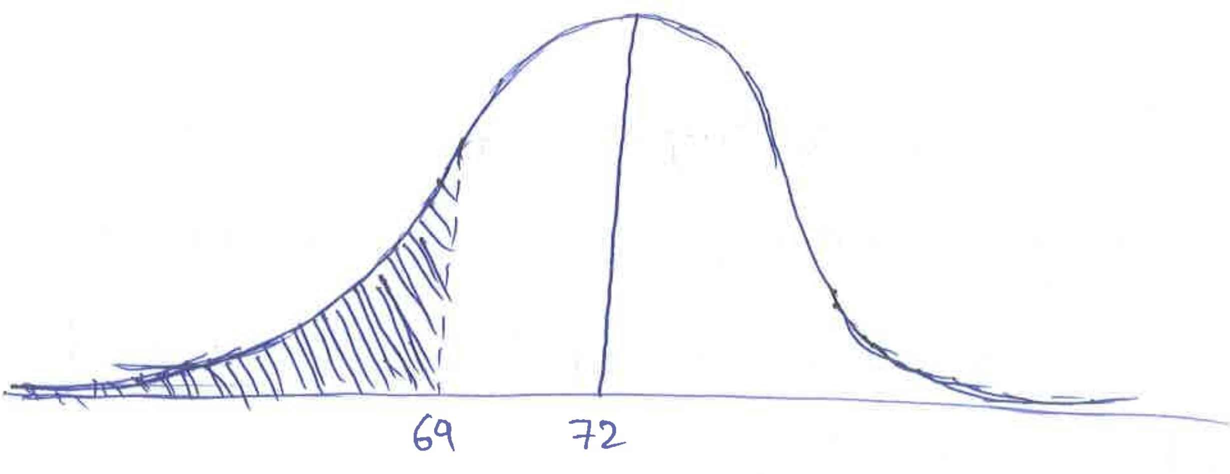
$$s.e = \frac{69-72}{\frac{10}{\sqrt{64}}} = \frac{-3}{\frac{\cancel{10}\,5}{\cancel{8}\,4}} = \frac{-12}{5} \overset{2.4}{=}$$

$$\boxed{s.e = -2.4}$$

d). $$Z_{score} = \frac{x-\mu}{s.e} = \frac{+3}{+2.4} = \underline{\underline{1.25}}$$

2.4) 30 (1.25
24
60
48
120
120
0

e).



Q2.

$P(S) = 20\%$ $P(\sim S) = 80\%$

$P(F/S) = 0.9$

$P(F/\sim S) = 0.05$

a). The prior probability is incoming messages are spam. $\boxed{P(S) = 0.2}$

b). $P(A/B)$ is the posterior probability.

→ posterior probability is the probability which we get after multiplying eveidence factor to prior.

c). $P(B|A)P(A) + P(B/\sim A)P(\sim A)$ is the equation we use to calculate Total probability.

$P(F/S) = 0.9$, $P(S) = 0.2$

$P(F/\sim S) = 0.05$, $P(\sim S) = 0.8$

d). In the above example posterior probability will be higher than prior. Because the evidence factor is supporting the prior. So, the posterior probability increases.