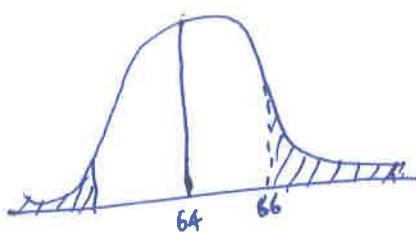


Q1.

- a) Population mean ≈ 100
 b) Sample mean $= 64$

Gokul Reddy

c)

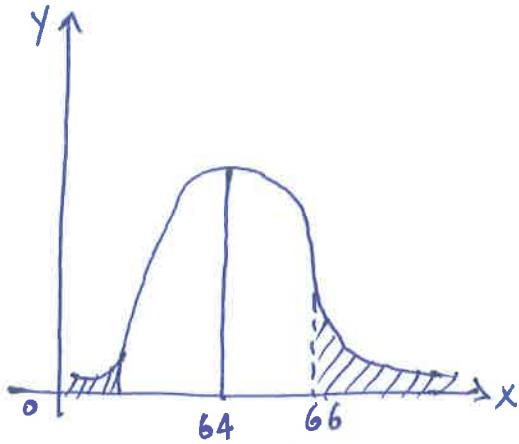


$$66 - 64 = 2$$

$$S.E. = \frac{2}{\sqrt{10}} = 0.2$$

* Standard error $= \frac{\sigma}{\sqrt{n}}$

d)



Q2.

- a) The prior probability here in the above equation is $P(A)$, the value of the prior probability based on the example is 20%.
- b) The posterior probability in the equation above is $P(B|A)$, if a message is spam, the filter marks it as spam with 90% probability.

$$P(A|B) = \frac{P(B|A) P(A)}{P(B|A) P(A) + P(B|A^c) P(A^c)}$$

$$\boxed{P(B|A) = 90\%, P(A) = 20\% \\ P(B|A^c) = 5\%, P(A^c) = 80\%}$$

$$= \frac{\left(\frac{90}{100}\right) \left(\frac{20}{100}\right)}{\left(\frac{90}{100}\right) + \left(\frac{20}{100}\right) + \left(\frac{80}{100}\right) \left(\frac{40}{100}\right)} =$$

$$\frac{\frac{9}{100}}{\frac{9}{100} + \frac{4}{100}}$$

$$= \frac{\frac{9}{100}}{\frac{13}{100}} = \frac{9}{13}$$

d] The Posterior Probability will be higher.

With the addition of new information, the posterior probability of the hypothesis increases. This is because the new information provides evidence that supports the hypothesis, which increases its likelihood. The posterior probability is calculated by multiplying the prior probability by the likelihood of the new information given the hypothesis.

Posterior Probability = $P(H|D) = \frac{P(D|H)P(H)}{P(D)}$

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