PROBLEM - 2

Normal Distribution for Strict Reviewer

$\Phi(t_1) \rightarrow \mu_1 = 30, \sigma_1 = 10$

Normal Distribution for Kind Reviewer

$\Phi(t_2) \rightarrow \mu_2 = 20, \sigma_2 = 5$

Normal Distribution is defined as :

$$\Phi(t) = \frac{1}{\sigma\sqrt{2\pi}} \exp\left(-\frac{(t-\mu)^2}{2\sigma^2}\right)$$

Probability of either Reviewers checking = 0.5

From Bayes Theorem,

$$\Phi(\text{Kind reviewer} \mid t=10) = \frac{\Phi_1(t, \mu=20, \sigma=5) \cdot P(\text{check})}{\Phi_1(t, \mu=20, \sigma=5) + \Phi_2(t, \mu=30, \sigma=10)}$$

$$\Rightarrow \Phi_1(t, \mu=20, \sigma=5) = \frac{1}{5\sqrt{2\pi}} \exp\left[\frac{-(10-20)^2}{2\times25}\right] = 0.0107$$

$$\Rightarrow \Phi_2(t, \mu=30, \sigma=10) = \frac{1}{10\sqrt{2\pi}} \exp\left[\frac{-(10-30)^2}{2\times100}\right] = 0.00539$$

P(check) for t_1 & t_2 = 0.5

$$\therefore \Phi(\text{Kind} \mid t=10) = \frac{0.0107 \times 0.5}{0.0107 \times 0.5 + 0.00539 \times 0.5}$$

$$= \boxed{0.665}$$

∴ Conditional Probability that the application was checked by a kind reviewer = 0.665