Solution of problem 2

Let's denote following events:

A – reviewer is strict
B – reviewer is kind
C – (t == 10)

Using the Bayes' theorem and the total probability formula we get:

$$P(B \mid C) = \frac{P(C \mid B)\, P(B)}{P(C)} = \frac{P(C \mid B)\, P(B)}{P(C \mid A)P(A) + P(C \mid B)P(B)}$$

Computing relative likelihoods at given point:

$$P(C \mid A) \text{ for } \frac{1}{\sqrt{2\pi}\sigma_A e^2}$$
$$P(C \mid B) \text{ for } \frac{1}{\sqrt{2\pi}\sigma_B e^2}$$

Substituting:

$$P(B \mid C) = \frac{1/\sigma_B}{1/\sigma_A + 1/\sigma_B} = \frac{2}{3}$$

Thus, given that the time of review t = 10, the conditional probability that the application was checked by a kind reviewer equals 2 / 3 .