

Student Information

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CENG222 Assignment 1

Answer 1

Lets say $P\{A\} = 0.2$ and $P\{B\} = 0.3$.

$P\{A \cap B\} = 0.2 * 0.3 = 0.06$ because they are independent.

$P\{A \cup B\} = 0.2 + 0.3 - 0.06 = 0.44$

$P\{A \cap B\} / P\{A \cup B\} = 0.06 / 0.44$
 $= 0.13636$

Answer 2

Lets say $P\{S\}$ means steroid user and $P\{N\}$ means test is negative.

$$P\{S\} = 0.05, P\{\bar{N}|S\} = 0.9, P\{\bar{N}|\bar{S}\} = 0.02$$

We know that, by using complement rule; $P\{\bar{S}\} = 0.95$, $P\{N|S\} = 0.1$, $P\{N|\bar{S}\} = 0.98$.

Question ask that $P\{S|N\}$

By using Bayes and Law of Total Probability rules we get that:

$$P\{S|N\} = P\{N|S\} * P\{S\} / (P\{N|S\} * P\{S\} + P\{N|\bar{S}\} * P\{\bar{S}\})$$

$$= 0.1 * 0.05 / (0.1 * 0.05 + 0.98 * 0.95)$$

$$= 0.005341$$

Answer 3

In this solution, first we must choose n of 5; after that we must choose 4-n of 4

For the solution we can calculate select 0 and 1 databases and we can extract them from 1.

Solution is =

$$1 - \binom{5}{0} * \binom{4}{4} / \binom{9}{4} - \binom{5}{1} * \binom{4}{3} / \binom{9}{4}$$

$$\begin{aligned} &= 1 - 1 * 1/126 - 5 * 4/126 \\ &= 1 - 21/126 \\ &= 105/126 \end{aligned}$$