Answer on Question #75764 – Math – Statistics and Probability

Question

The probability that a person over 60 years of age in a certain community drinks alcohol is 2/5 and the probability that a person over 60 years of age has heart disease is 2/15. The probability that a person over 60 years of age drinks alcohol and has heart disease is 1/6. Are 'drinking alcohol' and 'heart disease' independent events?

Solution

P(A) = 2/5 – The probability that a person over 60 years of age in a certain community drinks alcohol

P(B) = 2/15 – the probability that a person over 60 years of age has heart disease

P(AB) = 1/6 – the probability that a person over 60 years of age drinks alcohol and has heart diseas

If A and B are independent events, the probability of this event happening can be calculated as shown below:

$$P(AB) = P(A) * P(B)$$

$$P(A) * P(B) = \frac{2}{5} * \frac{2}{15} = \frac{4}{75}$$

$$P(AB) = \frac{1}{6}$$

$$P(A) * P(B) \neq P(AB)$$

Therefore, A (‘drinking alcohol’) and B(‘heart disease’) are dependent events.

Answer:

'Drinking alcohol' and 'heart disease' are not independent events.