Answer on Question #46508 – Math – Statistics and Probability

Question. True or False. Justify.

If two events A and B are mutually exclusive, they are not dependent.

Solution.

Definition 1. Events A and B are *independent* if $P(A \cap B) = P(A) \cdot P(B)$.

Definition 2. Events A and B are *mutually exclusive* $if\ P(A) + P(B) = 1$ and $P(A \cap B) = 0$.

We shall apply these definitions to our case. Let $P(A) = p \neq 0$. Note that events A and B are mutually exclusive $\Rightarrow P(A) + P(B) = 1$ and $P(A \cap B) = 0$. Then $P(B) = 1 - p$ and we have

$P(A \cap B) = 0 \neq p(1 - p) = P(A) \cdot P(B) \Rightarrow$ the statement is false.

Answer. False.