ST221 Introduction to Statistics
2021-21 Semester 1
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Practice Assignment 1 (Quiz): Solutions

Ten questions for 10% each of them.
Chapter 1: Probabilities; Lectures 1-4.

1. In a sample of 150 girls, we counted 75 girls wearing *Denim trousers*, 60 girls wearing *Black top* and 45 girls wearing *both Denim trousers and a Black top.*

   We pick randomly a girl from the sample. What is the probability that she:

   (a) Wears Denim trousers.

   (b) Does not wear a Black top.

   (c) Wears Denim trousers and doesn't wear Black-top.

   (d) Wears Black top, given that she wears Denim trousers.

   (e) (TRUE/FALSE) Are the events "The girl wears Denim trousers" and "The girl wears a Black top" independent?

2. Let $\Omega = \{a_1, a_2, a_3, a_4\}$ be the sample space of a random experiment. Let also $A = \{a_1, a_2\}$ and $B = \{a_2, a_3\}$ be two events of Ω such that $P(A \cup B) = 0.6$.

   (a) Find the probability $P(\{a_4\})$.

   (b) For now on assume that $P(A) = 0.3$ and $P(B) = 0.5$. Find the probability $P(\{a_2\})$.

   (c) Find the probability $P(\{a_1\})$.

3. The 10% of the people of a city are infected by some virus.

   A rapid test asserts if the examined person is positive in the virus.

   The probability that the test ends to be "Positive" (i.e. the test asserts that the person examined is infected) equals with:

   0.9 when the examined person is infected and

   0.05 when the examined person is not infected.

   We pick randomly a person and apply to him the rapid test.

   (a) Find the probability the person to be found as "Positive" in the rapid test.

   (b) Find the probability a person who appears as "Positive" in the rapid test to be not infected. *Give your answer correct in two decimal places.*