STAT 5700 — Quiz 1
Date: September 4, 2025
SOLUTIONS

Problem 1

How many ways are there to choose 8 applicants from a pool of 73 applicants? Write out the formula, but you do not need to calculate the result.

$$\binom{73}{8} = \frac{73!}{65!\,8!}$$

Problem 2

Suppose $P(A) = 0.45$, $P(B) = 0.30$, and $P(A \cup B) = 0.6$.

a. Find $P(A \cap B)$

$$P(A \cap B) = P(A) + P(B) - P(A \cup B) = 0.45 + 0.30 - 0.60 = 0.15$$

b. Find $P(A' \cap B')$

$$P(A' \cap B') = P[(A \cup B)'] = 1 - P(A \cup B) = 1 - 0.60 = 0.40$$

Problem 3

Suppose you draw one card at random from a standard 52-card deck.

Events: - A: The card is red
- B: The card is black
- C: The card is a heart

For each pair of events, indicate whether they are mutually exclusive, mutually exhaustive, both, or neither.

a. A **and** B

Mutually exclusive and mutually exhaustive

b. A **and** C

Neither

c. B **and** C

Mutually exclusive