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

1. TRUE/FALSE: $P(A \cap B) \leq P(A \cup B)$
   TRUE
2. How many ways are there to choose 3 applicants from a pool of 13 applicants? Write out the formula, but you do not need to calculate the result.

$$\binom{13}{3} = \frac{13!}{10!3!}$$

Use the following scenario to answer Problems 3 - 5.

Suppose you toss two fair 6-sided dice. The following events are defined:

- A: The number on the first die is even
- B: The number on the first die is odd
- C: There is an odd number on at least one die

3. Which of the following pairs of events are **mutually exclusive**?

   a. A and B
   b. A and C
   c. B and C
   d. (a) and (b) are both correct
   e. None of the above

4. Which of the following pairs of events are **mutually exhaustive**?

   a. A and B
   b. A and C
   c. B and C
   d. (a) and (b) are both correct
   e. None of the above

5. What is $P(A' \cap B')$?

   $P(A' \cap B') = 0$. To see this, note that $A' \cap B' = \emptyset$, or alternatively $A \cup B = 1$, so by DeMorgan's Laws and Rule of Complements, $P(A' \cap B') = P[(A \cup B)'] = 1 - P(A \cup B) = 1 - 1 = 0$