

MATH 421 – QUIZ 1 – FALL 2019 || 50 POINTS || 25 MINUTES

Instructions: Show all work. No collaboration or references.
No computational devices allowed without instructor permission.

Print
Name _____

1. (4 pts) In a class of 37 students, a group of 5 is to be selected for a project. How many distinct groups can be formed?
2. (4 pts) How many possible ways can a team manager decide on the batting order for a baseball team with 9 players?
3. (8 pts) If a 6-sided die is to be rolled 3 times, what is the probability that the outcome includes a pair (2 rolls with the same face value) and a single (1 roll a different face value)?
4. (8 pts) Given that $P(A \cup B) = 0.7$, $P(A) = 0.5$, and $P(B) = 0.4$, find $P(B | A)$. Are A and B independent?
5. (6 pts) Consider the cumulative distribution function for discrete random variable X given by $F(x) = \frac{x+1}{5}$ for $x = 1, 2, 3, 4, 5$. Calculate $P(2 < X < 5)$.

6. (4 pts) Find k so that the following is a probability function. $f(x) = \begin{cases} kx & \text{for } x = 1, 2 \\ \frac{k}{4} & \text{for } x = 3, 4 \end{cases}$

7. (8 pts) For a particular factory in one day, 8,000 items are produced on line A and 2,000 on line B. Out of those produced on line A, 1% are defective, and 2% of those produced on line B are defective. If an item is randomly selected and found to be defective, what is the probability it was produced on line A?

8. (8 pts) An estate includes 10 paintings. Four of the paintings are different paintings but by the same artist, and the other six paintings are distinct paintings each by a different artist. If the owner is to gift these paintings to 5 heirs randomly, what is the probability that a single heir will get all 4 paintings that share the same artist but none of the other paintings? Assume that each painting out of the 10 is equally likely to go to any of the 5 heirs.