

Name: _____

July 7, 2017

FINITE MATH: QUIZ 5

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- The Honor Code is in effect for this quiz. All work must be your own.
- Please turn off all cellphones or any other electronic devices.
- Calculators are NOT allowed.
- The bonus question may only bring your score up to a maximum of 10. It is NOT possible to get more than 10 points on this quiz.
- The quiz lasts 12 minutes.

Useful Formulas

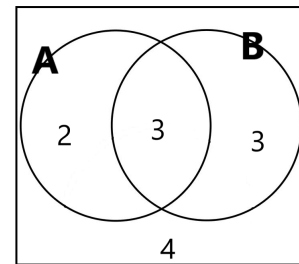
- IE: $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
- IE for mutually exclusive events: $P(A \cup B) = P(A) + P(B)$
- CP: $P(E) = 1 - P(E')$
- DeMorgan Laws: $(A \cup B)' = A' \cap B'$ and $(A \cap B)' = A' \cup B'$
- $n! = n \cdot (n-1) \cdot (n-2) \cdots 3 \cdot 2 \cdot 1$
- $P(n, k) = \underbrace{n \cdot (n-1) \cdot (n-2) \cdots (n-k+1)}_{k \text{ factors multiplied}} = \frac{n!}{(n-k)!}$
- Rearrangements with multiplicities: $\frac{n!}{r_1! \cdot r_2! \cdots r_k!}$
- $C(n, k) = \binom{n}{k} = \frac{n!}{k!(n-k)!} = \frac{P(n, k)}{k!}$

Problem 1. A bag contains 7 red marbles, 5 white marbles, and 8 yellow marbles.

- a) (2pt) Select 3 marbles at random. What is the probability of picking at least one yellow marble?
- b) (2pt) Select 3 marbles at random. What is the probability that they are either all red or all yellow?
- c) (2pt) Select **six** marbles at random. What is the probability of picking exactly 3 red and 3 yellow?

Problem 2. (2pt) Roll a six-sided die and observe the number that comes up. What is the probability of rolling a number less than 5? (Note: 5 is not less than 5).

Problem 3. (2pt) The Venn Diagram on the right shows the number of students enrolled in either Art or Biology. You randomly select a student from the group. Let A be the event that the student is taking Art, and B the event that the student is taking Biology. What is $P(A' \cap B')$?



Problem 4. (BONUS + 1pt) Using digits from $\{1, 2, 3, 4, 5\}$, create a 3-digit number without repeating the same digit. What is the probability that the 3-digit number you obtain is smaller than 400? You may assume equally likely outcomes.