

Probability: Quiz Two, March 24, 2026

Name/ID: _____

- 1) Let $\Omega = \{1, 2, \dots, p\}$, \mathcal{F} be the set of all subsets of Ω , and $\mathbf{P}(A) = |A|/p$ for all $A \in \mathcal{F}$. Here $|A|$ = “number of elements in A ”. Suppose p is **prime**. Show that, if A and B are independent, then at least one of A and B is either \emptyset or Ω . **Hint:** p is prime.

- 2) Box 1 contains 1 white and 999 red balls. Box 2 contains 1 red and 999 white balls. A ball is picked from a randomly selected box. If the ball is red what is the probability that it came from Box 1?

- 3) A crime is committed by one of the two suspects, A and B. Initially, there is **equal evidence** against both of them. In further investigation at the crime scene, it is found that the guilty party had a blood type found in 10% of the population. Suspect A does match this blood type, whereas the blood type of Suspect B is unknown. Given this new information, what is the probability that A is the guilty party?
- 4) A box contains 40 good and 10 defective fuses. If 10 fuses are selected, what is the probability they will all be good?