

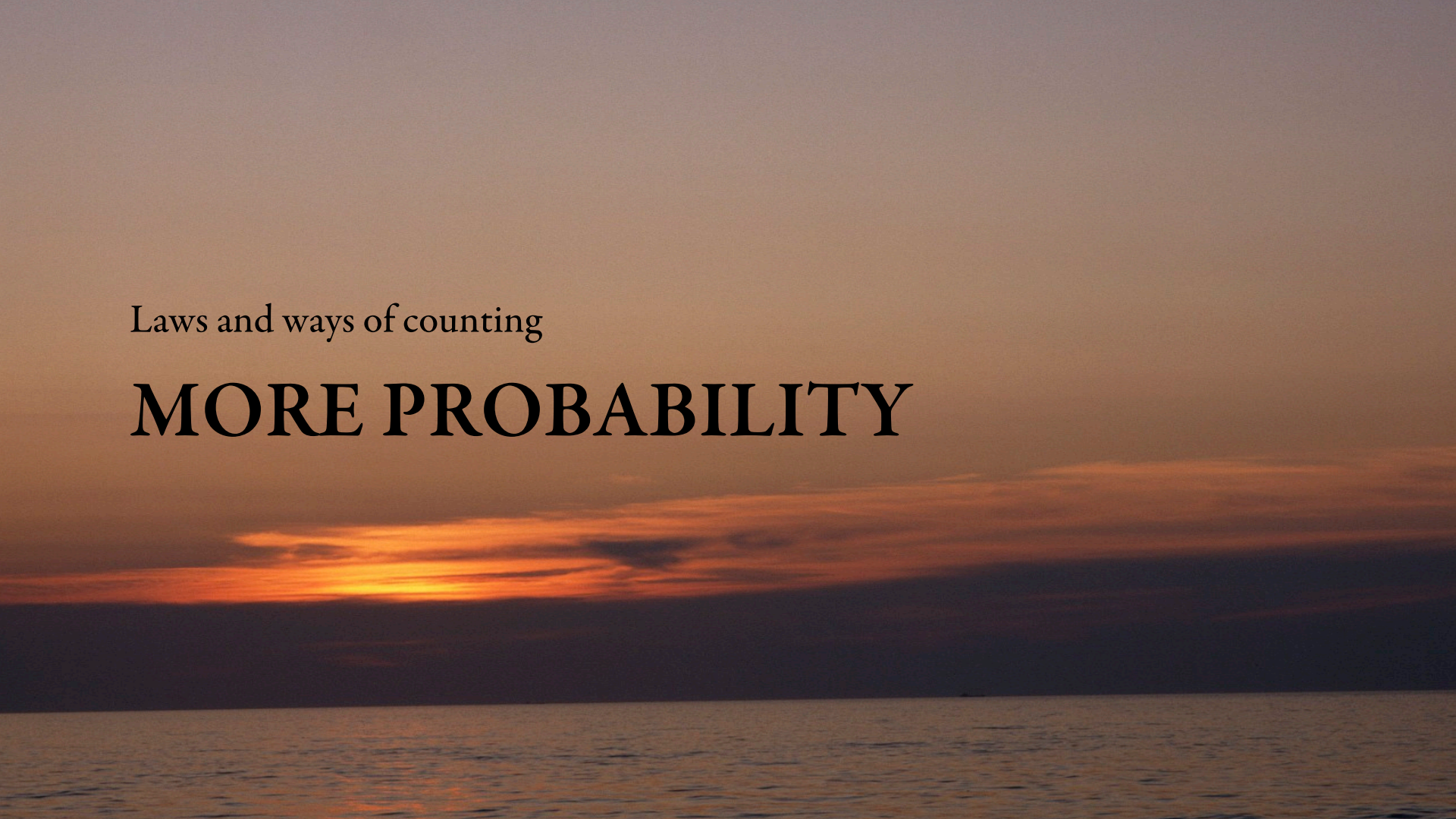


ASQ CRE Prep course

Lesson II. A. 2. b.

Basic Probability Concepts

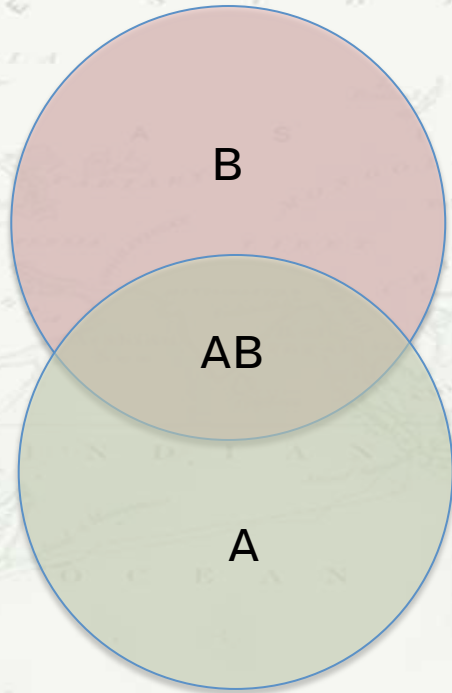
Laws and Counting

A serene sunset scene over a calm body of water. The sky transitions from a pale, hazy blue at the top to a deep orange and red near the horizon, where the sun is partially obscured by thin, dark clouds. The water in the foreground is dark and reflects the colors of the sky.

Laws and ways of counting

MORE PROBABILITY

Additive Law



$$\begin{aligned}P(A \cup B) &= P(A) + P(B) - P(A \cap B) \\&= 0.65 + 0.65 - (0.65 \times 0.65) \\&= 1.30 - 0.4225 \\&= 0.8775\end{aligned}$$

Multiplicative Law

$$P(A|B) = \frac{P(A \cap B)}{P(B)}, P(B) \neq 0$$

If events A and B are independent, then

$$P(A|B) = P(A) \times P(B)$$

Permutations

The number of ways that n distinct objects can be **arranged** taking them r at a time is:

$$P_r^n = n(n-1)(n-2)\cdots(n-r+1) = \frac{n!}{(n-r)!}$$

Combinations

**The number of
different combinations
that can be formed
from n distinct objects
taken r at a time is:**

$$C_r^n = \frac{n!}{r!(n-r)!}$$

When should
you use
permutations?



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Expectation