



ASQ CRE Prep course

Lesson II. A. 2. a.

Basic Probability Concepts

Probability

A wide-angle photograph of a sunset over a calm sea. The sun is a bright yellow orb in the upper center, partially obscured by the horizon. Its light reflects off the dark blue water below. In the sky, several small birds are silhouetted against the bright sun. The overall atmosphere is peaceful and warm.

Let's calculate the odds

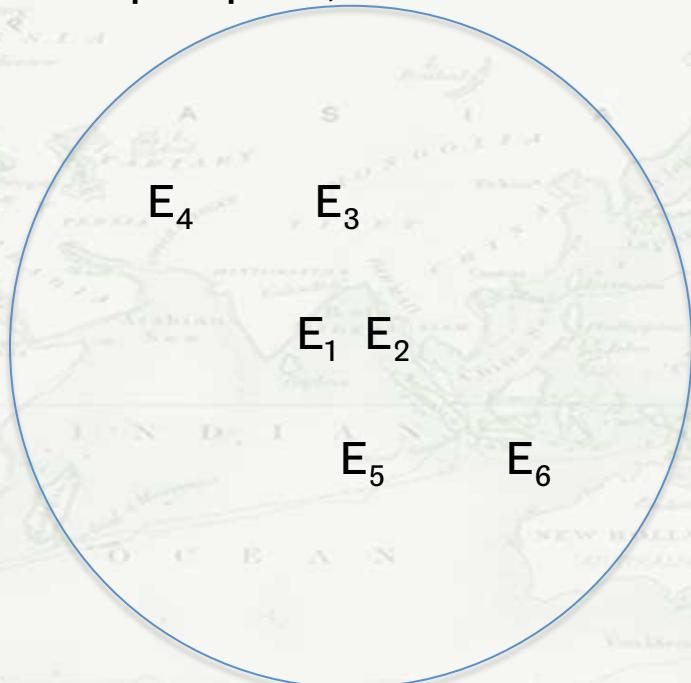
BASIC PROBABILITY CONCEPTS

Conditions for Probability

- **The probability of an event, E , lies between zero and one**
- **The sum of the probabilities of all possible events in the sample space, S , is one**
- **A fair coin**
- **A fair 6-sided die**
- **A product chance to survive a year**

Union

Sample space, S

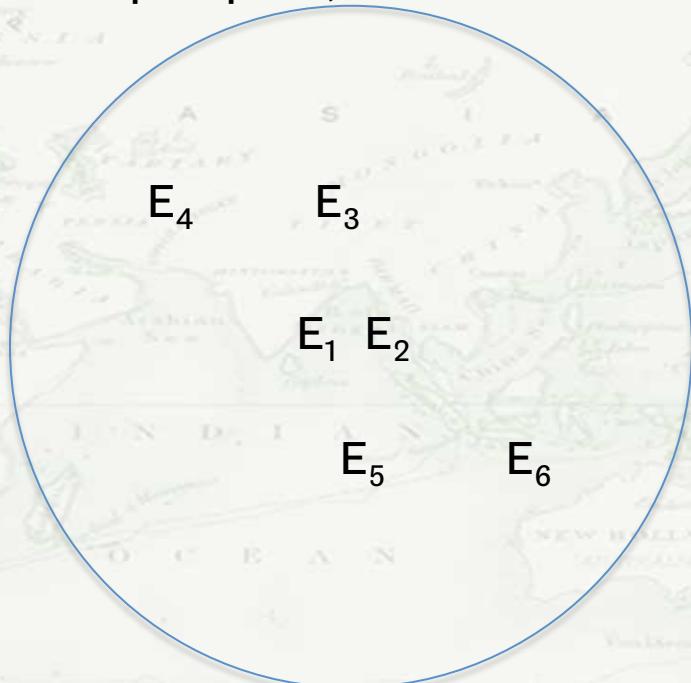


If A and B are two events in a sample space, S , the union of A and B contains all sample points in event A or B or both.

Which Events, E 's, are in $A \cup B$?

Intersection

Sample space, S



If A and B are two events in a sample space, S , the intersection of A and B is composed of all sample points that are in both A and B .

Which Events, E 's, are in $A \cap B$?

Complement

Sample space, S

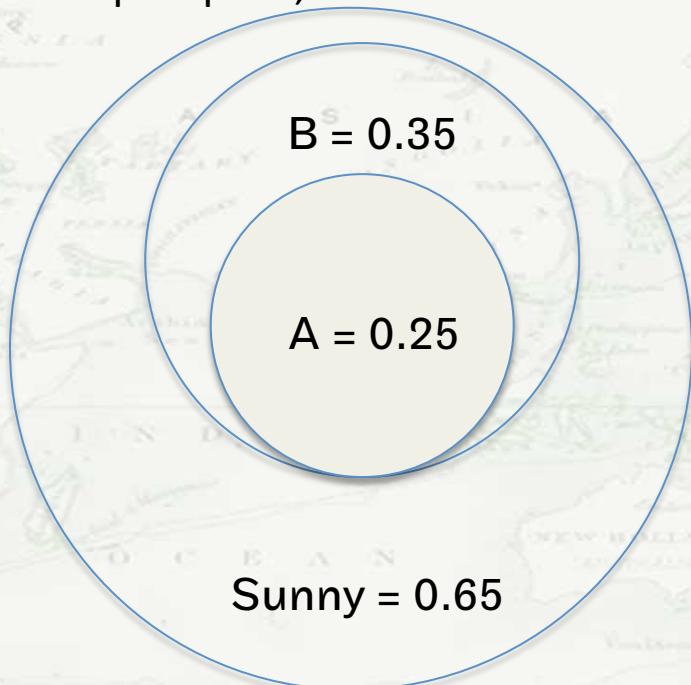
$$P_1 = 0.25$$

$$1 - P_1 =$$

The complement of an event A is all sample points in the sample space, S , but not in A .

Conditional

Sample space, S

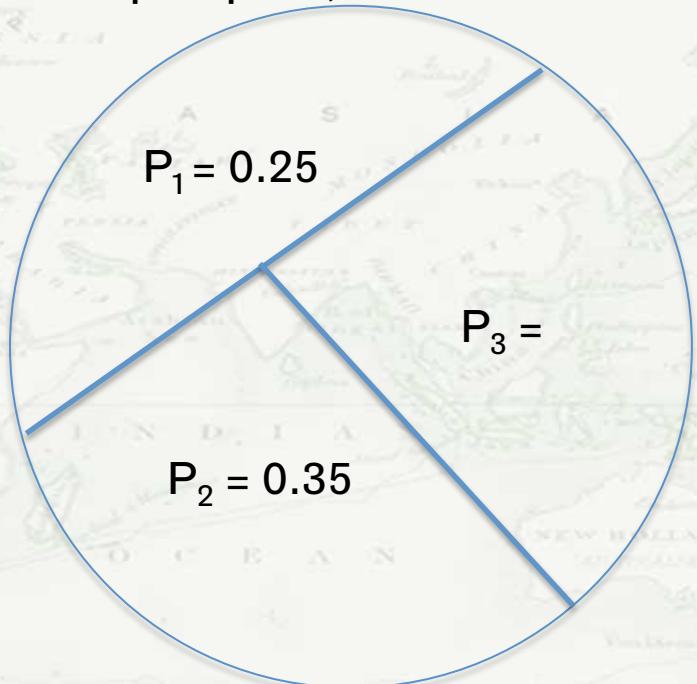


The conditional probability of event A given
That B has occurred is:

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

Mutually Exclusive

Sample space, S



If two events are mutually exclusive when
They do not share any sample points

Independent

Two events are independent when

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

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

Is this coming back
to you?

Don't Panic



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Lesson II. A. 2. b.

Basic Probability Concepts

Laws and Counting