Probabilty Space = (Ω, F, P)

(i) Ω: set of all outcomes

(ii) F: set of all events each is a subset of Ω

(iii) P: prob. measure on each A ∈ F

Ex: Ω = \{ (i, j) : 1 ≤ i ≤ 6, 1 ≤ j ≤ 6 \}

|Ω| = "cardinality of Ω"

|Ω| = 36

A = \{ (1,6), (2,5), ..., (6,1) \}

|A| = 6

P(A) = \frac{|A|}{|Ω|} = \frac{6}{36}

A = \{ \text{event} \}

B = \{ \text{Black dice} \}

W dice

B dice

\sum_{i=1}^{6} \frac{7}{4}

\sum_{j=1}^{6} \frac{7}{4}
Ex: Throw 2 dice. E = W

Ω = \{ (i, j) : 1 \leq i, j \leq 6 \}

| Ω | = 6 \times 6 = 36

F = \{ all \; 5 \; or \; 6 \} = \{ A : A \subseteq Ω \}

| F | = 2 \; | Ω | = 2

8. Set operations

Let A, B are 2 sets

Intersection: \( AB = \{ c : c \in A \; and \; c \in B \} \)

Union: \( A \cup B = \{ d : d \in A \; or \; d \in B \} \)

Ex: A = \"sum of 7\"

B = \"both dice show 6\"

\( A \cup B = \{ (1,6), (2,5), \ldots , (6,1), (6,2), \ldots , (6,6) \} \)

\( AB = \{ (6,1) \} \)
The complement of a set $A$ is

$$A^c = \{ b : b \in \Omega \text{ and } b \notin A \}$$

Karnaugh map

Hence

$$(A^c B^c)^c = A \cup B$$ \quad \text{(de Morgan's law)}$$
How many triangles?

One triangle = 3 lines

\[
\binom{n}{k} = \frac{n(n-1) \ldots (n-k+1)}{k(k-1) \ldots 2 \cdot 1} = \frac{n(n-1) \ldots 1}{k(k-1) \ldots 1 (n-k) \ldots 1}
\]

\[
= \frac{n!}{k! (n-k)!}
\]