

4.5 Rules of Probability ①

$$0 \leq P(E) \leq 1$$

$$P(S) = 1$$

$$P(\emptyset) = 0$$

Union Rule of Probability.

$$P(E \cup F) = P(E) + P(F) - P(E \cap F)$$

$$n(S) = 52$$

$$P(R) = \frac{26}{52}$$

$$n(R) = 26$$

$$P(K) = \frac{4}{52}$$

$$n(K) = 4$$

$$P(R \cap K) = \frac{2}{52}$$

$$P(R \cup K) = \frac{26}{52} + \frac{4}{52} - \frac{2}{52} = \frac{28}{52}$$

$$S = \{ (1,1) (1,2) (1,3) (1,4) (1,5) (1,6) \quad \textcircled{2} \\ (2,1) (2,2) (2,3) (2,4) (2,5) (2,6) \\ (3,1) (3,2) (3,3) (3,4) (3,5) (3,6) \\ (4,1) (4,2) (4,3) (4,4) (4,5) (4,6) \\ (5,1) (5,2) (5,3) (5,4) (5,5) (5,6) \\ (6,1) (6,2) (6,3) (6,4) (6,5) (6,6) \}$$

$$E = \{ (1,1) (1,2) (1,3) (1,4) (1,5) (1,6) \\ (2,1) (2,2) (2,3) (2,4) (2,5) (2,6) \}$$

$$F = \{ (1,5) (2,4) (3,3) (4,2) (5,1) \}$$

$$E \cap F = \{ (1,5) (2,4) \}$$

$$\begin{aligned} P(E \cup F) &= P(E) + P(F) - P(E \cap F) \\ &= \frac{12}{36} + \frac{5}{36} - \frac{2}{36} = \frac{15}{36} \end{aligned}$$

$$P(E \cup F) = P(E) + P(F)$$

$$P(E^c) = 1 - P(E)$$

Odd,

③

The odd in favor of an Event E are defined to be ratio of $P(E)$ to $P(E^c)$

$$\frac{P(E)}{P(E^c)} = \frac{P(E)}{1 - P(E)}$$

$$\frac{a}{b} = \frac{P(E)}{1 - P(E)}$$

$$a(1 - P(E)) = b P(E)$$

$$a - a P(E) = b P(E)$$

$$a = a P(E) + b P(E)$$

$$a = P(E) [a + b]$$

$$P(E) = \frac{a}{a + b}$$

$$\frac{3}{2}$$

$$P(W)$$

$$P(E) \Rightarrow \frac{a}{a+b} = \frac{3}{2}$$

$$a = 3$$

$$b =$$

$$a+b=2$$

$$a/b = 3/2$$

$$\therefore P(E) = \frac{3}{3+2} = \frac{3}{5}$$