

Ncert exemplar

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Question 12.13.3.38

A and B throw a pair of dice alternately. A wins the game if he gets a total of 6 and B wins if she gets a total of 7. If A starts the game, find the probability of winning the game by A in third throw of the pair of dice.

Solution: Let $X = \{X_1, X_2\}$ be a random variable represent number on dice.

$X = (X_1 + X_2 \leq 12)$

Probabilities,

$$p(X_1 + X_2 = 6) = \frac{5}{36} \quad (1)$$

$$p(X_1 + X_2 \neq 6) = 1 - \frac{5}{36} = \frac{31}{36} \quad (2)$$

$$p(X_1 + X_2 = 7) = \frac{6}{36} \quad (3)$$

$$p(X_1 + X_2 \neq 7) = 1 - \frac{6}{36} = \frac{30}{36} \quad (4)$$

For A to win in third throw

$$p(A) = p(X_1 + X_2 \neq 6) p(X_1 + X_2 \neq 7) p(X_1 + X_2 = 6) \quad (5)$$

$$= \frac{31}{36} \times \frac{30}{36} \times \frac{5}{36} \quad (6)$$

$$= 0.09 \quad (7)$$