

Assignment 9

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Python code link: <https://github.com/ParvezAlam123/Assignment-9>

1 Prob. Misc. 5.29

Let a pair of dice be thrown and the random variable X be the sum of the numbers that appear on the two dice. Find the mean or expectation of X .

Solution: Let X_1 be random variable for first dice and X_2 be random variable for second dice

$$X_1, X_2 \in \{1, 2, 3, 4, 5, 6\}$$

$$X = X_1 + X_2$$

$$X \in \{2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$$

Expectation:

$$\begin{aligned} X &= X_1 + X_2 \\ E[X] &= E[X_1 + X_2] \\ &= E[X_1] + E[X_2] \\ &= \sum_{i=1}^6 x_i P(X_1 = x_i) + \sum_{i=1}^6 x_i P(X_2 = x_i) \\ &= \frac{1}{6}(1 + 2 + 3 + 4 + 5 + 6) + \frac{1}{6}(1 + 2 + 3 + 4 + 5 + 6) \\ &= \frac{1}{6} \times 2 \times 21 \\ &= 7 \end{aligned}$$

