

Solution of question 10.15.1.23

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Question: A game consists of tossing a one rupee coin 3 times and noting its outcome each time. Hanif wins if all the tosses give the same result i.e., three heads or three tails, and loses otherwise. Calculate the probability that Hanif will lose the game.

Solution: A coin toss can have only two outcomes which are:

- 1) Heads
- 2) Tails

But, we have 3 coins in total. So, there can be a total of 2^3 outcomes. Hence, the total numbers of outcomes comes out to be 8.

Out of these 8 outcomes, there are 2 outcomes for:

- 1) All 3 coins show heads
- 2) All 3 coins show tails

Hence, there are 2 outcomes in which he wins and 6 outcomes in which he loses.

$$P(event) = \frac{\text{Number of favourable outcomes}}{\text{Number of total outcomes}} \quad (1)$$

$$P(Hanif\text{loses}) = \frac{\text{Number of outcomes in which he loses}}{\text{Number of total outcomes}} \quad (2)$$

$$= \frac{6}{8} \quad (3)$$

$$= \frac{3}{4} \quad (4)$$

$$= 0.75 \quad (5)$$

Hence, the probability of Hanif losing the game is 0.75.