

Question: A student says that if you throw a die, it will show up 1 or not 1. Therefore, the probability of getting 1 and the probability of getting 'not 1' each is equal to $\frac{1}{2}$. Is this correct? Give reasons.

Solution:

Suppose if we throw a die,

The total number of outcomes = 6

Possible outcomes(X) = 1 or 2 or 3 or 4 or 5 or 6

Let

$$X = \begin{cases} 1, & \text{if 1} \\ 0, & \text{if not 1} \end{cases} \quad (1)$$

Then

$$p_X(0) = \frac{5}{6} \quad (2)$$

$$p_X(1) = 1 - p_X(0) \quad (3)$$

$$= 1 - \frac{5}{6} \quad (4)$$

$$= \frac{1}{6} \quad (5)$$

Since, $p_X(1)$ and $p_X(0)$ are not equal. \therefore The given statement is not true