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:

Let

$$X = \begin{cases} 1, & \text{if } 1 \\ 0, & \text{if not } 1(2,3,4,5,6) \end{cases} \tag{1}$$

Then

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

$$p_X(1) = 1 - p_X(0) \tag{3}$$

$$= 1 - \frac{5}{6} \tag{4}$$

$$= \frac{1}{6} \tag{5}$$

$$\implies p_X(0) \neq p_X(1) \tag{6}$$

Since, $p_X(1)$ and $p_X(0)$ are not equal.

$\therefore$ The given statement is not true