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: :

No, this is not correct.

Suppose if we throw a die,

Then total number of outcomes = 6

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

Hence, Probability of getting 1 be $p_x(k) = \frac{1}{6}$

Now,

$$p_X(k') = 1 - p_X(k) \tag{1}$$

$$p_X(1') = p_x(2) + p_x(3) + p_x(4) + p_x(5) + p_x(6) \tag{2}$$

$$p_X(1') = \frac{5}{6} \tag{3}$$

$\therefore$ $p_X(1)$ and $p_X(1')$ is not equal.