Chapter 13 Probability

Jay Vikrant EE22BTECH11025

Q10.13.3.38: In a game, the entry fee is Rs 5.The game consists of a tossing a coin 3 times.If one or two heads show, Sweta gets her entry fee back.If she throws 3 heads, she receives double the entry fees.Otherwise she will lose. For tossing a coin three times, find the probability that she

1) loses the entry fee.
2) gets double entry fee.
3) just gets her entry fee.

Solution: Let, X be random variable such that

Random variable	denoted	Events
X	0	loses the entry fees
	1	gets double the entry fees
	2	just gets the entry fees

TABLE 3
RANDOM VARIABLES

Probability that she loses the entry fees,

$$\Pr(X=1) = {}^{3}C_{3}\left(\frac{1}{2}\right)^{3-3}\left(\frac{1}{2}\right)^{3} \tag{1}$$

$$= \left(\frac{1}{2}\right)^{3} \tag{2}$$

$$= 0.125 \tag{3}$$

Probability that she gets double entry fees,

$$\Pr(X=1) = {}^{3}C_{3}\left(\frac{1}{2}\right)^{3-3}\left(\frac{1}{2}\right)^{3} \tag{4}$$

$$= \left(\frac{1}{2}\right)^{3} \tag{5}$$

$$= 0.125 \tag{6}$$

Probability that she just gets the entry fees,

$$\Pr(X=2) = 1 - \Pr(X=0) - \Pr(X=1) \tag{7}$$

$$= 1 - 0.125 - 0.125 \tag{8}$$

$$= 0.750 \tag{9}$$