Chapter 13 Probability

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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

$$X = \begin{cases} 0 & ,0 \text{ heads} \\ 1 & ,1 \text{ heads} \\ 2 & ,2 \text{ heads} \\ 3 & ,3 \text{ heads} \end{cases} \tag{1}$$

The PMF of above X is given by,

$$p_X(k) = {}^3C_k p^{3-k} q^k \qquad ,k \in 0,1,2,3 \tag{2}$$

Random variable	denote	Probability
X	0	$\frac{1}{8}$
	1	$\frac{3}{8}$
	2	$\frac{3}{8}$
	3	$\frac{1}{8}$

TABLE 3
Random Variables

From table (3) we can say,
Probability that she loss the fees (0 heads),

$$\Pr(X = 0) = \frac{1}{8} \tag{3}$$
$$= 0.125 \tag{4}$$

Probability that she gets double entry fees(3 heads),

$$\Pr(X = 3) = \frac{1}{8} \tag{5}$$
$$= 0.125 \tag{6}$$

Probability that she just gets the entry fees(1 heads + 2 heads),

$$\Pr(X = 1 + X = 2) = \Pr(X = 1) + \Pr(X = 2) \tag{7}$$
$$= \frac{3}{8} + \frac{3}{8} \tag{8}$$
$$= 0.750 \tag{9}$$