

Chapter 13 Probability

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Q10.13.3.38: In a game, the entry fee is Rs 5. The game consists of 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,

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

Parameter	value	description
X_0	$\frac{1}{8}$	0 head
X_1	$\frac{3}{8}$	1 head
X_2	$\frac{3}{8}$	2 heads
X_3	$\frac{1}{8}$	3 heads
n	3	total number of trials
p,q	$\frac{1}{2}$	toss result in heads/tails

TABLE 3
RANDOM VARIABLES

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

$$\Pr(X = 0) = \frac{1}{8} \quad (2)$$

$$= 0.125 \quad (3)$$

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

$$\Pr(X = 3) = \frac{1}{8} \quad (4)$$

$$= 0.125 \quad (5)$$

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

$$\Pr(X = 1 + X = 2) = \Pr(X = 1) + \Pr(X = 2) \quad (6)$$

$$= \frac{3}{8} + \frac{3}{8} \quad (7)$$

$$= 0.750 \quad (8)$$