

# 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 the random variable that represent the number of heads appearing on dices.

Parameter	value	description
X	0	0 head
	1	1 head
	2	2 heads
	3	3 heads
n	3	total number of dices
p,q	$\frac{1}{2}$	toss result in heads/tails

TABLE 3  
RANDOM VARIABLES

$$X_i = \begin{cases} \frac{1}{8} & , i=0 \text{ heads comes in 3 tosses} \\ \frac{3}{8} & , i=1 \text{ heads comes in 3 tosses} \\ \frac{3}{8} & , i=2 \text{ heads comes in 3 tosses} \\ \frac{1}{8} & , i=3 \text{ heads comes in 3 tosses} \end{cases} \quad (1)$$

From above equations (1) 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),

$$\Pr(X_1 + X_2) = \Pr(X_1) + \Pr(X_2) \quad (6)$$

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

$$= 0.750 \quad (8)$$