EE23010 NCERT Exemplar

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Question 10.13.3.35
Box A contains 25 slips of which 19 are marked Rs 1 and others are marked Rs 5 each. Box B contains 50 slips of which 45 are marked Rs 1 and others are marked Rs 13 each. Slips of both boxes are poured into a third box and reshuffled. A slip is drawn at random. What is the probability that it is marked other than Rs 1?
Solution:
Let

Random variable	Value	Definition
X	0	Slips of Rs 1
	1	Slips of Rs 5
	2	Slips of Rs 13
Y	0	Box A
	1	Box B

TABLE I
DISTRIBUTION

pmf's of Y

$$p_Y(0) = \frac{1}{3} \tag{1}$$

$$p_Y(1) = \frac{2}{3} \tag{2}$$

$$\tag{3}$$

Conditional Probabilty,

$$\Pr(Y = 0|X = 0) = \frac{19}{25} \tag{4}$$

$$\Pr(Y = 0|X = 1) = \frac{6}{25} \tag{5}$$

$$\Pr(Y = 1|X = 0) = \frac{45}{50} \tag{6}$$

$$\Pr(Y = 1|X = 2) = \frac{5}{50} \tag{7}$$

Probability that the slip is marked other than 1,

$$= p_Y(0) \times \Pr(Y = 0|X = 1) + p_Y(1) \times \Pr(Y = 1|X = 2) \tag{8}$$

$$= \frac{1}{3} \times \frac{6}{25} + \frac{2}{3} \times \frac{5}{50} \tag{9}$$

$$= \frac{11}{75} \tag{10}$$