

Assignment-3

EE22BTECH11012-A.Chhatrapati

Question 10.13.3.37) A child's game has 8 triangles of which 3 are blue and rest are red, and 10 squares of which 6 are blue and rest are red. One piece is lost at random. Find the probability that it is a

- (i) triangle
- (ii) square
- (iii) square of blue colour
- (iv) triangle of red colour

Solution:

TABLE 4
RANDOM VARIABLES

Variable	Value	Description
X	1	Triangle
	0	Square
Y	1	Blue coloured
	0	Red coloured

$$p_X(X) = \begin{cases} \frac{10}{18}, & \text{if } X = 0 \\ \frac{8}{18}, & \text{if } X = 1 \end{cases} \quad (1)$$

$$\Pr(Y = 0|X = 1) = \frac{5}{8} \quad (2)$$

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

$$\Pr(Y = 0|X = 0) = \frac{4}{10} \quad (4)$$

$$\Pr(Y = 1|X = 0) = \frac{6}{10} \quad (5)$$

$$(i) \ p_X(1) = \frac{8}{18}$$

$$(ii) \ p_X(0) = \frac{10}{18}$$

$$(iii) \ p_{XY}(0, 1) = \Pr(Y = 1|X = 0) p_X(0) = \frac{6}{18}$$

$$(iv) \ p_{XY}(1, 0) = \Pr(Y = 0|X = 1) p_X(1) = \frac{5}{18}$$