RD Sharma Solutions Class 11 Maths Chapter 33 Ex 33.1

Chapter 33 Probability Ex 33.1 Q1

Since one coin is tossed, so there are two possibility either head turned up or tail.

SO, the sample space will be

$$S = \{H, T\}$$

Where, H – if head turned up.

T – if tail turned up.

Probability Ex 33.1 Q2

Since two coins are tossed, so the possibilities are either both coin shows head, or tail, or one shows head and other shows tail or vice-versa.

Let H represent head and
T represent tail

Thus, the sample space is given by,

$$S = \{HT, TH, HH, TT\}$$

Probability Ex 33.1 Q3

Since three coins are tossed. So, we have these possibilities.

(i) All coins shows head.

(ii) All coins shows tail.

(iii) First two coins shows head and last coin shows tail.

(iv) First and third coins shows, head and second coin shows tail.

(v) Last two coins shows head and first coin shows tail.

(vi) First coin shows head and last two coins shows tail.

(vii) First and third coin shows tail and second coin shows head.

(viii) Third coin shows head and first two coins shows tail.

So, the number of element in sample space $= 2^3 = 8$

Thus, the sample will be,

$$S = \{HHH, TTT, HHT, HTH, THH, HTT, THT, TTH\}$$

Probability Ex 33.1 Q4

Since four coins are tossed, so the possibilities are either

$HHHH$ or $TTTT$ or $HHHT$ or $HHTH$ or $HTHH$ or $THHH$ or $HHTT$ or $HTTH$ or $HTHT$ or $THHT$ or $THTH$ or $TTHH$ or $HTTT$ or $THTT$ or $TTHT$ or $TTTH$

It means nos of elements in sample space $= 2^4 = 16$

$$S = \begin{Bmatrix} HHHH, & TTTT, & HHHT, & HHTH, & HTHH, & THHH, & HHTT, & HTTH \\ HTHT, & THHT, & THTH, & TTHH, & HTTT, & THTT, & TTHT, & TTTH \end{Bmatrix}$$

Probability Ex 33.1 Q5

In a dice there are six faces with numbers $1, 2, 3, 4, 5, 6$

So, when two dice are thrown, then we have two faces of dice (one of each) show any two combination of numbers from $1, 2, 3, 4, 5, 6$

Thus, the nos of element in sample space $= 6^2 = 36$

$$S = \begin{Bmatrix} (1,1), (1,2), (1,3), (1,4), (1,5), (1,6), (2,1), (2,2), (2,3), (2,4), (2,5), (2,6), \\ (3,1), (3,2), (3,3), (3,4), (3,5), (3,6), (4,1), (4,2), (4,3), (4,4), (4,5), (4,6), \\ (5,1), (5,2), (5,3), (5,4), (5,5), (5,6), (6,1), (6,2), (6,3), (6,4), (6,5), (6,6) \end{Bmatrix}$$

Probability Ex 33.1 Q6

Since three dice are thrown together, so each of the three dice will show one face with number $1, 2, 3, 4, 5$ or 6.

So, the total number of elementary events associated is $6 \times 6 \times 6 = 216$.

Probability Ex 33.1 Q7

$\because$ When a coin is tossed, either tail or head will turn up, where as when a dice is thrown, we have one face with either of $1, 2, 3, 4, 5$ or 6.

So, the total number of elementary events associated with this experiment is $2 \times 6 = 12$ and the sample space will be

$$S = \{(H,1), (H,2), (H,3), (H,4), (H,5), (H,6), (T,1), (T,2), (T,3), (T,4), (T,5), (T,6)\}$$

Probability Ex 33.1 Q8

When a coin is tossed either head or tail will turn up. And, when head turns up then a dice is rolled otherwise not.

So, the total number of elementary events associated with this experiment is $1 + 6 \times 1 = 7$

Thus, the sample space will be

$$S = \{T, (H,1), (H,2), (H,3), (H,4), (H,5), (H,6)\}$$

Probability Ex 33.1 Q9

When a coin is tossed two times, then we have the following possibilities

$HH,\ TT,\ TH$ and TT

Now, according to the question, when we have tail in 2nd throw, then a dice is thrown.

So, the total number of elementary events associated with this experiment are

$2+2\times 6 = 14$

and the sample space will be

$$S = \begin{Bmatrix} HH,\ TH,\ (HT,1),\ (HT,2),\ (HT,3),\ (HT,4),\ (HT,5),\ (HT,6) \\ (TT,1),\ (TT,2),\ (TT,3),\ (TT,4),\ (TT,5),\ (TT,6) \end{Bmatrix}$$

Probability Ex 33.1 Q10

In this experiment, a coin is tossed and if the outcome is tail then a die is tossed once.

Otherwise, the coin is tossed again.

The possible outcome for coin is either head or tail.

The possible outcome for die is 1,2,3,4,5,6.

If the outcome for the coin is tail then sample space is S1={(T,1),(T,2),(T,3),(T,4),(T,5),(T,6)}

If the outcome is head then the sample space is S2={(H,H),(H,T)}

Therefore the required sample space is S={(T,1),(T,2),(T,3),(T,4),(T,5),(T,6),(H,H),(H,T)}

Probability Ex 33.1 Q11

$\because$ A coin is tossed, then we have either heads (H) or tails (T).

If tail turned up, then a ball is drawn from a box which has 2 red and 3 black balls.

So, $S_1 = \{(T,R_1),\ (T,R_2),\ (T,B_1),\ (T,B_2),\ (T,B_3)\}$

If head turned up, then die is rolled

So, $S_2 = \{(H,1),\ (H,2),\ (H,3),\ (H,4),\ (H,5),\ (H,6)\}$

Thus, the elementary events associated with this experiment is

$S = \{S_1 \cup S_2\}$

$= \{(T,R_1),\ (T,R_2),\ (T,B_1),\ (T,B_2),\ (T,B_3),\ (H,1),\ (H,2),\ (H,3),\ (H,4),\ (H,5),\ (H,6)\}$

Probability Ex 33.1 Q12

In this experiment, a coin is tossed and if the outcome is tail the experiment is over.

Otherwise, the coin is tossed again.

In the second toss also if the outcome is tail the experiment is over, otherwise tossed again.

In the third toss, if the outcome is tail, the experiment is over, otherwise tossed again.

This process continues indefinitely.

Hence, the sample space S associated to this random experiment is

$$S = \{T, HT, HHT, HHHT, HHHHT, \ldots\}$$

Probability Ex 33.1 Q13

In a box 1 Red ball
3 Black ball

Since two balls are drawn without replacement then the elementary event associated with this experiment is

$$S = \begin{Bmatrix} (R,B_1), & (R,B_2), & (R,B_3), & (B_1,B_2), & (B_1,B_3), & (B_1,R), \\ (B_2,R), & (B_2,B_1), & (B_2,B_3), & (B_3,R), & (B_3,B_1), & (B_3,B_2) \end{Bmatrix}$$

Probability Ex 33.1 Q14

Since a pair of dice is rolled, so total number of elementary events = $6^2 = 36$

Again, if the doublet is outcomes i.e., we have either $(1,1), (2,2), (3,3), (4,4), (5,5), (6,6)$ then a coin is tossed, then we have H or T.

$\therefore$ Total number of elementary events = $6 \times 2 = 12$

Thus, the total number of elementary events = $30 + 12 = 42$

Note: The doublet $(1,1), (2,2), (3,3), (4,4), (5,5), (6,6)$ was also included in 36. So we look 30 in final conclusion.

Probability Ex 33.1 Q15

A coin is tossed twice. So, the elementary events are

$S_1 = \{HH, HT, TH, TT\}$

Now,

if the second drawn results is head, then a die is rolled then the elementary events is

$$S_2 = \begin{Bmatrix} (HH,1), & (HH,2), & (HH,3), & (HH,4), & (HH,5), & (HH,6), \\ (TH,1), & (TH,2), & (TH,3), & (TH,4), & (TH,5), & (TH,6) \end{Bmatrix}$$

Thus, sample space associated with this experiment is

$S = S_1 \cup S_2$

$$S = \begin{Bmatrix} (HH,1), & (HH,2), & (HH,3), & (HH,4), & (HH,5), & (HH,6), & (HT), \\ (TH,1), & (TH,2), & (TH,3), & (TH,4), & (TH,5), & (TH,6), & (TT) \end{Bmatrix}$$

Probability Ex 33.1 Q16

Bag 4 red balls (identical)

3 black ball (identical)

$\because$ A ball is drawn in first attempt, so elementary events is

$S_1 = \{R, B\}$

Now, the ball will put into the bag and draw are again

$S_2 = \{R, B\}$

Thus, the sample space associated is

$S = S_1 S_2 = \{RR, RB, BR, BB\}$

Probability Ex 33.1 Q17

In a random sampling, three items are selected so it could be any of the following:

a) All defective or

b) All non-defective or

c) Combination of defective and non defective.

Sample space associated with this experiment is

S={DDD, NDN, DND, DNN, NDD, DDN, NND, NNN}

Probability Ex 33.1 Q18

Since a family has two children

i) Then the sample space may be

$$S = \{(B_1, B_2),\ (B_1, G_2),\ (G_1, B_2),\ (G_1, G_2)\}$$

when subscript 1 and 2 represent elder and younger children.

ii) Since the family has two children so, the following possibility of boys in the family

i) No boys only girls

ii) One boy and one girl

iii) Two boys only

$\therefore\ S = \{0, 1, 2\}$

$S = \{0, 1, 2\}$

Probability Ex 33.1 Q19

Since we have 3 coloured dice

1 – red dice

1 – white dice and

1 – black dice

Now, one of the dice is drawn and rolled and the number of the face is noted.

So, in case red dice is drawn then the sample space will be

$$S_1 = \{(R, 1),\ (R, 2),\ (R, 3),\ (R, 4),\ (R, 5),\ (R, 6)\}$$

Similar argument for black dice

$$S_2 = \{(B, 1),\ (B, 2),\ (B, 3),\ (B, 4),\ (B, 5),\ (B, 6)\}$$

and for white dice

$$S_3 = \{(W, 1),\ (W, 2),\ (W, 3),\ (W, 4),\ (W, 5),\ (W, 6)\}$$

Thus, the sample space associated with this experiment is

$$S = S_1 \cup S_2 \cup S_3$$

$$= \begin{Bmatrix} (R,1),\ (R,2),\ (R,3),\ (R,4),\ (R,5),\ (R,6), \\ (B,1),\ (B,2),\ (B,3),\ (B,4),\ (B,5),\ (B,6), \\ (W,1),\ (W,2),\ (W,3),(W,4),\ (W,5),(W,6) \end{Bmatrix}$$

Probability Ex 33.1 Q20

Total number of rooms =2

Room	Boys	Girls
P	2	2
Q	1	3

Selecting a particular room can be done in 2 ways

Selecting a person from a particular room can be done in

P - 4

Q - 4

Elements in sample space are

$\{(P, Boy1);(P, Boy2);(P, Girl1)$

$(P, Girl2);(Q, Boy3);(Q, Girl3);(Q, Girl4);(Q, Girl5)\}$

So number of elements in required sample space is 8

Probability Ex 33.1 Q21

When one ball is drawn then it will be either white (W) or red (R)

Now, if white ball is drawn then it is replaced and a ball is drawn

$\therefore S \supset \{(W,W), (W,R)\}$

Also, if red ball is drawn then a die is rolled

$\therefore S \supset \{(R,1), (R,2), (R,3), (R,4), (R,5), (R,6)\}$

$\therefore$ The sample space is

$S = \{(W,W), (W,R), (R,1), (R,2), (R,3), (R,4), (R,5), (R,6)\}$

Probability Ex 33.1 Q22

Box

1 white ball

3 identical black ball

$\therefore$ Two balls are drawn at random without replacement then,

Sample space associated with this experiment is

$S = \{(W,B), (B,W), (B,B)\}$

Probability Ex 33.1 Q23

When a die is rolled then

$$S_1 = \{1, 2, 3, 4, 5, 6\}$$

When even number is turns up on the face then a coin is tossed

$$\therefore S_2 = \{(2, H), (2, T), (4, H), (4, T), (6, H), (6, T)\}$$

Where as when odd number turns up then coin is tossed two times

$$\therefore S_3 = \begin{Bmatrix} (1, HH), (1, HT), (1, TH), (1, TT), (3, HH), (3, HT), \\ (3, TH), (3, TT), (5, HH), (5, HT), (5, TH), (5, TT) \end{Bmatrix}$$

$\therefore$ Sample space associated with this experiment is

$$S = [S_2 \cup S_3]$$

$$S = \begin{Bmatrix} (2, H), (2, T), (4, H), (4, T), (6, H), (6, T), (1, HH), \\ (1, HT), (1, TH), (1, TT), (3, HH), (3, HT), (3, TH), \\ (3, TT), (5, HH), (5, HT), (5, TH), (5, TT) \end{Bmatrix}$$

Probability Ex 33.1 Q24

In this experiment, a die is rolled. If the outcome is 6 then experiment is over. Otherwise, die will be rolled again and again.

So, the sample space is

$$S = \begin{Bmatrix} 6, (1, 6), (2, 6), (3, 6), (4, 6), (5, 6), (1, 1, 6), (1, 2, 6), \\ (1, 3, 6), (1, 4, 6), (1, 5, 6), (2, 1, 6), (2, 2, 6), \ldots\ldots \end{Bmatrix}$$