

RD Sharma
Solutions
Class 11 Maths
Chapter 33
Ex 33.2

RD Sharma Class 11 Solutions Chapter-33 Probability Ex 33.2 Q1

Since a coin is tossed, so the total nos of elementary events is

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

$$\Rightarrow n(S) = 2$$

Also, the total no. of events

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

$$= 4$$

Probability Ex 33.2 Q2

Since we are tossing two coins so, the all events associated with random experiment are

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

Total=15

From above the elementary events are $\{HH\}, \{HT\}, \{TH\}, \{TT\}$

Total elementary event=4

Probability Ex 33.2 Q3

A - Getting three heads = $\{HHH\} = 1$

B - Getting two heads and one tail = $\{HHT, THH, HTH\} = 3$

C - Getting three tails = $\{TTT\} = 1$

D - Getting a head on the first coin = $\{HHH, HHT, HTH, HTT\} = 4$

i) Which pairs of events are mutually exclusive?

We know that A and B are said to be mutually exclusive if $A \cap B = \emptyset$

a) A and B b) A and C c) B and C d) C and D are mutually exclusive

ii) Which events are elementary events?

A and C are elementary events.

iii) Which events are compound events?

Clearly B and D are union of three events and 4 events respectively.

$\therefore B$ and D are compound events.

Probability Ex 33.2 Q4

Since a die was thrown. So elementary events are

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

i) $A = \{1, 2, 3, 4, 5, 6\}$

ii) $B =$ Getting a number greater than 7.

$B = \emptyset$ [\because A die has 1,2,3,4,5,6 members only]

iii) $C =$ Getting a multiple of 3.

$C = \{3, 6\}$

iv) $D =$ Getting a number less than 4.

$D = \{1, 2, 3\}$

v) $E =$ Getting an even number greater than 4.

$E = \{6\}$

vi) $F =$ Getting a number not less than 3.

$F = \{3, 4, 5, 6\}$

Also, $A \cup B = \{1, 2, 3, 4, 5, 6\}$

$A \cap B = \{\emptyset\}$

$B \cap C = \{\emptyset\}$

$E \cap F = \{6\}$

$D \cap F = \{3\}$

$\bar{F} = 1 - F = \{1, 2\}$

Probability Ex 33.2 Q5

Sample space associated with given event is

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

$$(i) A = \{ HTT, THT, TTH \}, B = \{ HHT, THH, HTH \}$$

A and B are mutually exclusive events

$$(ii) A = \{ HHH, TTT \}, B = \{ HHT, THH, HTH \} \text{ and}$$

$$C = \{ HTT, THT, TTH \}$$

Above events are exhaustive and mutually exclusive events.

$$\text{Because } A \cap B = B \cap C = C \cap A = \emptyset \text{ and } A \cup B \cup C = S$$

$$(iii) A = \{ HHH, HHT, THH, HTH \}$$

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

A and B are not mutually exclusive because $A \cap B \neq \emptyset$

$$(iv) A = \{ HHH, HHT, THH \}, B = \{ THT, TTH, TTT \}$$

A and B are mutually exclusive but not exhaustive

$$A \cap B = \emptyset \text{ and } A \cup B \neq S$$

Probability Ex 33.2 Q6

(i)

A = both numbers are odd

$$= \{ (1,1), (1,3), (1,5), (3,1), (3,3), (3,5), (5,1), (5,3), (5,5) \}$$

(ii)

B = both numbers are even

$$= \{ (2,2), (2,4), (2,6), (4,2), (4,4), (4,6), (6,2), (6,4), (6,6) \}$$

(iii)

C = Sum of numbers is less than 6

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

$$A \cup B = \{ (1,1), (1,3), (1,5), (3,1), (3,3), (3,5), (5,1), (5,3), (5,5), (2,2),$$

$$(2,4), (2,6), (4,2), (4,4), (4,6), (6,2), (6,4), (6,6) \}$$

$$A \cap B = \emptyset$$

$$A \cup C = \{ (1,1), (1,2), (1,3), (1,4), (1,5), (2,1), (2,2), (2,3), (3,1), (3,2),$$

$$(4,1), (3,3), (3,5), (5,1), (5,3), (5,5) \}$$

$$A \cap C = \{ (1,1), (1,3), (3,1) \}$$

$$B \cap C = \emptyset$$

Probability Ex 33.2 Q7

A = Getting an even number on the first die.

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

B = Getting an odd number on the first die.

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

C = Getting at most 5 as sum of the numbers on the two dice.

$C = \{(1,1), (1,2), (1,3), (1,4), (2,1), (2,2), (2,3), (3,1), (3,2), (4,1)\}$

D = Getting the sum of the numbers on the dice > 5 but < 10 .

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

E = Getting at least 10 as the sum of the numbers on the dice.

$E = \{(4,6), (5,5), (5,6), (6,4), (6,5), (6,6)\}$

F = Getting an odd number on one of the dice.

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

Its clear that A and B are mutually exclusive events and $A \cap B = \emptyset$

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

$B \cap C = \{(1,1), (1,2), (1,3), (1,4), (3,1), (3,2)\}$

$A \cap E = \{(4,6), (6,4), (6,5), (6,6)\}$

$A \cup F = \{(2,1), (2,2), (2,3), (2,4), (2,5), (2,6),$

$(4,1), (4,2), (4,3), (4,4), (4,5), (4,6)$

$(6,1), (6,2), (6,3), (6,4), (6,5), (6,6)$

$(1,1), (1,2), (1,3), (1,4), (1,5), (1,6)$

$(3,1), (3,2), (3,3), (3,4), (3,5), (3,6)$

$(5,1), (5,2), (5,3), (5,4), (5,5), (5,6)\}$

$A \cap F = \{(2,1), (2,3), (2,5), (4,1), (4,3), (4,5), (6,1), (6,3), (6,5)\}$

(ii)

a) T $A \cap B = \emptyset$ b) T $A \cap B = \emptyset$ and $A \cup B = S$

c) F $A \cap C \neq \emptyset$ d) F $A \cap B = \emptyset$ and $A \cup B \neq S$

e) T $C \cap D = D \cap E = C \cap E = \emptyset$ and $C \cup D \cup E = S$

f) T $A^1 \cap B^1 = \emptyset$ g) F $A \cap F \neq \emptyset$

Probability Ex 33.2 Q8

We have four slips of paper with numbers 1, 2, 3 & 4.

A person draws two slips without replacement.

\therefore Number of elementary events = 4C_2

$$\therefore n(s) = \frac{4 \times 3}{2 \times 1} = 6$$

A = The number on the first slip is larger than the one on the second slip

$$A = \{(2, 1), (3, 1), (3, 2), (4, 1), (4, 2), (4, 3)\}$$

B = The number on the second slip is greater than 2

$$\therefore B = \{(1, 3), (2, 3), (1, 4), (2, 4), (3, 4), (4, 3)\}$$

C = The sum of the numbers on the two slips is 6 or 7

$$\therefore C = \{(2, 4), (3, 4), (4, 2), (4, 3)\}$$

and,

D = The number on the second slip is twice that on the first slip

$$D = \{(1, 2), (2, 4)\}$$

and, A and D form a pair of mutually exclusive events as $A \cap D = \phi$

Probability Ex 33.2 Q9

(i)

Sample space for picking up a card from a set of 52 cards is set of 52 cards itself

(ii)

For an event of chosen card be black faced card, event is a set of jack, king, queen of spades and clubs