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# NCERT Class 10 Chapter 13 Probability CBSE Board Sample Problems Long Answer (For CBSE, ICSE, IAS, NET, NRA 2022)

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### Question

In figure is shown a disc on which a player spins an arrow twice. The fraction  $a/b$  is formed, where 'a' is the number of sector on which arrow stops on the first and b is the number of the sector in which the arrow stops on second spin. On each spin, each sector has equal chance of selection by the arrow. Find the probability that the  $\frac{a}{b} > 1$ .

### Solution

For  $\frac{a}{b} > 1$ , when  $a = 1$ , b cannot take any value

$a = 2$ , b can take 1 value

$a = 3$ , b can take 2 value, i.e.. 1 and 2

$a = 4$ , b can take 3 value, i.e.. 1,2, 3

$a = 5$ , b can take 4 value, i.e.. 1,2, 3,4

$a = 6$ , b can take 5 value, i.e.. 1, 2,3, 4,5

Total possible outcomes =  $6 \times 6 = 36$

Favourable outcomes =  $1 + 2 + 3 + 4 + 5 = 15$

$$P\left(\frac{a}{b} > 1\right) = \frac{\text{Number of favourable outcomes}}{\text{Number of total possible outcomes}} = \frac{15}{36} = \frac{5}{12}$$

### Question

A number x is selected at random from the numbers 1, 4,9, 16 and another number is selected at random from the numbers 1,2, 3,4. Find the probability that the value of xy is more than 16.

### Solution

x can be 1,4, 9 or 16 and y can be 1,2, 3 or 4.

Total number of cases of  $xy$  is 16.

Number of cases when  $xy$  is more than 16 is

$(9 \times 2), (9 \times 3), (9 \times 4), (16 \times 2), (16 \times 3), (16 \times 4)$ , i.e.. 6 cases.

$$P(\text{value of } xy \text{ more than } 16) = \frac{6}{16} = \frac{3}{8}$$

## Question

**A number  $x$  selected at random from the numbers 1,2, 3 and 4. Another number  $y$  is selected at random from the numbers 1,4, 9 and 16. Find the probability that product of  $x$  and  $y$  is less than 16.**

## Solution

$x$  can be any one of 1,2,3 or 4 and  $y$  can be any one of 1,4, 9 or 16.

Total number of cases of  $xy = 16$

Number of cases when product is less than 16 is

$1 \times 1, 1 \times 4, 1 \times 9, 2 \times 1, 2 \times 4, 3 \times 1, 3 \times 4, 4 \times 1$ , i.e.. 8 cases.

$$\text{Required probability} = \frac{\text{Number of favourable cases}}{\text{Total number of cases}} = \frac{8}{16} = \frac{1}{2}$$

## Question

**A jar contains 54 marbles each of which is blue, green or white. The probability of selecting a blue marble at random from the jar is  $\frac{1}{3}$  and the probability of selecting a green marble at random is  $\frac{4}{9}$ . How many white marbles does the jar contain?**

## Solution

Let there be  $b$  blue,  $g$  green and  $w$  white marbles in the jar. Then,

$$b + g + w = 54$$

$$\therefore P(\text{Selecting a blue marble}) = \frac{b}{54}$$

It is given that the probability of selecting a blue marble is  $\frac{1}{3}$ .

$$\frac{1}{3} = \frac{b}{54}$$

$$\Rightarrow b = 18$$

We have,

$$P(\text{Selecting a green marble}) = \frac{4}{9}$$

$$\frac{g}{54} = \frac{4}{9}$$

$$[P(\text{Selecting a green marble}) = \frac{g}{54}]$$

$$\Rightarrow g = 24$$

Substituting the values of b and g in (i), we get

$$18 + 24 + w = 54 \Rightarrow w = 12$$

## Question

**A card is drawn from a well shuffled deck of cards**

**What are the odds in favour of getting spade?**

**What are the odds against getting a spade?**

**What are the odds in favour of getting a face card?**

**What are the odds in favour of getting a red king?**

## Solution

Total cards 52

Spade = 13

Remaining cards 39

i. The odds in favour of getting spade 13

The odds is not in favour of getting spade 39

$$\frac{12}{52} : \frac{39}{52} = 1 : 3.$$

2. The odds against getting a spade 13

The odds not against getting a spade 39

$$\frac{39}{52} : \frac{13}{52} = 3 : 1$$

3. The odds in favour of getting a face card 12

The odds not in favour of getting a face card 40

$$\frac{12}{52} : \frac{40}{52} = 3 : 10$$

4. The odds in favour of getting a red king 2

The odds not in favour of getting a red king 50

$$= \frac{2}{52} : \frac{50}{52} = 1 : 25$$

### Question

**Pair of dice is rolled simultaneously. Find the probability of getting a**

**(a) Sum of 9 or 11 on the dice**

**(b) Product of 6 on the dice**

### Solution

$$P(\text{sum 9 or 11}) = \frac{6}{36} = \frac{1}{6}$$

$$P(\text{product 6}) = \frac{4}{36} = \frac{1}{9}$$

### Question

**From a deck of playing cards, all clubs, aces and jacks are removed. The deck is shuffled well and then a card is drawn out at random. What is the probability that the card drawn is (i) a queen (ii) a face card (iii) a red card?**

### Solution

$$\text{Number of cards} = 52 - 13 - 3 - 3 = 33$$

$$P(\text{Queen}) = \frac{3}{33} = \frac{1}{11}$$

$$P(\text{face card}) = \frac{6}{33} = \frac{2}{11}$$

$$P(\text{Red card}) = \frac{22}{33} = \frac{2}{3}$$

### Question

**Two dice are rolled simultaneously. Find the probability of getting**

**(a) Total of 8 or 10**

**(b) Product 12**

### Solution

$$P(\text{sum 8 or 10}) = \frac{8}{36} = \frac{2}{9}$$

$$P(\text{product 12}) = \frac{4}{36} = \frac{1}{9}$$

### Question

**The king, queen and jack of clubs are removed from a deck of 52 playing cards and the well shuffled. One card is selected from the remaining cards. Find the probability of getting:**

(i) A heart

(ii) A king

(iii) A club

### **Solution**

$$\text{No. of cards} = 52 - 3 = 49$$

$$P(\text{heart}) = \frac{13}{49}$$

$$P(\text{king}) = \frac{3}{49}$$

$$P(\text{club}) = \frac{10}{49}$$

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