

EXERCISE 25.1

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1. A coin is tossed 1000 times with the following frequencies:

Head: 445, Tail: 555

When a coin is tossed at random, what is the probability of getting?

(i) A head?

(ii) A tail?

Solution:

Given total number of times a coin is tossed = 1000

Number of times a head comes up = 445

Number of times a tail comes up = 555

(i) Probability of getting head = number of heads/total number of trials
= $(445/1000)$
= 0.445

(ii) Probability of getting tail = number of tail/total number of trials
= $(555/1000)$
= 0.555

2. A die is thrown 100 times and outcomes are noted as given below:

Outcome	1	2	3	4	5	6
Frequency	21	9	14	23	18	15

If a die is thrown at random, find the probability of getting a/an:

(i) 3

(ii) 5

(iii) 4

(iv) Even number

(v) Odd number

(vi) Number less than 3.

Solution:

Given total number of trials = 100

(i) From the table, number of times 3 comes up = 14

Probability of getting 3 = frequency of 3/ total number of trials
= $14/100$

$$= 7/50$$

(ii) From the table, number of times 5 comes up = 18

Probability of getting 5 = frequency of 5/ total number of trails

$$= 18/100$$

$$= 9/50$$

(iii) From the table, number of times 4 comes up = 23

Probability of getting 4 = frequency of 4/ total number of trails

$$= 23/100$$

(iv) Frequency of getting an even number = Frequency of 2 + Frequency of 4 + Frequency of 6

$$= 9 + 23 + 15$$

$$= 47$$

Probability of getting an even number = frequency of an even number/ total number of trails

$$= 47/100$$

(v) Frequency of getting an even number = Frequency of 1 + Frequency of 3 + Frequency of 5

$$= 21 + 14 + 18$$

$$= 53$$

Probability of getting odd number = frequency of odd number/ total number of trails

$$= 53/100$$

(vi) Frequency of getting number less than 3 = Frequency of 1 + Frequency of 2

$$= 21 + 9$$

$$= 30$$

Probability of getting number less than 3 = frequency of number less than 3/ total number of trails

$$= 30/100$$

$$= 3/10$$

3. A box contains two pair of socks of two colours (black and white). I have picked out a white sock. I pick out one more with my eyes closed. What is the probability that I will make a pair?

Solution:

Given number of socks in the box = 4

Let B and W denote black and white socks respectively. Then we have

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

If a white sock is picked out, then the total no. of socks left in the box = 3

$$\text{Number of white socks left} = 2 - 1 = 1$$

$$\begin{aligned}\text{Probability of getting white socks} &= \frac{\text{number of white socks left in the box}}{\text{total number of socks left in the box}} \\ &= \frac{1}{3}\end{aligned}$$

4. Two coins are tossed simultaneously 500 times and the outcomes are noted as given below:

Outcome:	Two heads (HH)	One head (HT or TH)	No head (TT)
Frequency:	105	275	120

If same pair of coins is tossed at random, find the probability of getting:

(i) Two heads

(ii) One head

(iii) No head.

Solution:

Given number of trials = 500

From the given table it is clear that,

$$\text{Number of outcomes of two heads (HH)} = 105$$

$$\text{Number of outcomes of one head (HT or TH)} = 275$$

$$\text{Number of outcomes of no head (TT)} = 120$$

$$\begin{aligned}\text{(i) Probability of getting two heads} &= \frac{\text{frequency of getting 2 heads}}{\text{total number of trials}} \\ &= \frac{105}{500} \\ &= \frac{21}{100}\end{aligned}$$

$$\begin{aligned}\text{(ii) Probability of getting one head} &= \frac{\text{frequency of getting 1 heads}}{\text{total number of trials}} \\ &= \frac{275}{500} \\ &= \frac{11}{20}\end{aligned}$$

$$\begin{aligned}\text{(iii) Probability of getting no head} &= \frac{\text{frequency of getting no heads}}{\text{total number of trials}} \\ &= \frac{120}{500}\end{aligned}$$

= 6/25

