

Solutions

1. Write a frequency table for the number of heads in a toss of 4 coins. For example, in a toss of two coins, frequency of 0 is 1 (i.e, HH), frequency of 1 is 2 (i.e, HT or TH) and the frequency of 2 is 1 (HH).

Soln:

<i>number..of..heads :</i>	0	1	2	3	4
<i>frequency..of..no :</i>	1	4	6	4	1

2. Draw a histogram for the following frequency table:

<i>scores..in..test</i>	0 – 60	61 – 70	71 – 80	81 – 90	91 – 100
<i>no..of..students</i>	11	24	13	9	4

Soln: First interchange x and y so that inverse function will also be in terms of x . You get $x = \frac{1}{y+1}$. Now solve for y to get the inverse function: $x = \frac{1}{y+1}$ means $y + 1 = 1/x$ and thus $y = (1/x) - 1$.

3. Find the probability that out of fifty two cards, (a) you will get all spades (b) a four.

Soln: Since there are 13 spades, answer for (a) is $13/52 = 1/4$. (Alternatively you can argue that there are four types, and spade is one type out of four). Similarly, for (b) answer is $1/13$.

4. Given that $P(A) = 0.5, P(B) = 0.3, P(A \cup B) = 0.7$, find $P(A \cap B)$ and $P((A \cup B)')$. What do these two probabilities mean? [For example, $P(A \cup B)$ is the probability of either A or B].

Soln: Because $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ we get that $P(A \cap B) = P(A) + P(B) - P(A \cup B) = 0.5 + 0.3 - 0.7 = 0.1$. This is the probability that A and B both happen. $P((A \cup B)') = 1 - P(A \cup B) = 0.3$.

5. Find the number of 3 letter acronyms that can be formed with the letters A,B,C,D,E,F. [For example, AAA, BBC, ABC, FDA,...]

Soln: This is just $6^3 = 216$.

6. Find the probability that the acronym in question 5 will have 3 different letters.

Soln: The number of acronyms with distinct letters is $6P_3 = (6)(5)(4) = 120$. The number of acronyms with repetition allowed is 216 as found in problem 5. So the probability that they will have distinct letters is $120/216 = 5/9$ or 55.56 percent.