Assessment_1 - One Neuron -Tech Neuron- Statistics Assessments
Name: Krishna Kumar

1. Two unbiased dice are thrown. Find the probability that
   a. Both dice show same number
   b. First die show 6
   c. Total number on dice is 8
   d. Total number on dice is >8
   e. Total number on dice is 13 and total number on dice is between 2 to 12 both inclusive

   Sol:
   a. Both dice show same number
      = 1/6
   b. First die show 6
      =1/6
   c. Total number on dice is 8
      = 5/36
   d. Total number on dice is >8
      =5/18
   e. Total number on dice is 13 and total number on dice is between 2 to 12 boh inclusive
      Total number on dice 13 is =0
      total number on dice is between 2 to 12 boh inclusive = 1

2. Four cards are drawn at random from a pack of 52. Find the probability that
   a. They are king, queen jack and ace
   b. Two kings and two queens
   c. Two black or two red
   d. Two hearts or two diamonds
   Sol :
   a.They are king, queen jack and ace
      P= [4C1*4C1*4C1*4C1] / [52C4] = 0.000945

   b.Two kings and two queens

      P =[4C2*4C2] / [52C4] =   0.00013

   c.Two black or two red
      P=[26C2*26C2] / [52C4] = 0.394

   d.Two hearts or two diamonds
      P=[13C2*13C2] / [52C4] = 0.0224

3. An urn contains 6 white, 4 red, 9 black balls. If 3 balls are drawn at random find the probability of
   a. 2 are white
   b. One of each colour
   c. None is red
   d. At Least 1 is white

Sol:

3 Balls are drawn

19 balls total

Number of ways at 3 balls can be drawn is 19C3 =969

   a. 2 are white = 6C2 X 13C1 =195 , so
      Probability = 195/969

   b. One of each colour
      6C1 X 4C1 X 9C1 = 216
      Probability = 216/969

   c. None is red   =
      15C1 =455
      Probability = 455/969 =65/323

   d. At Least 1 is white=
      Non white balls can draw =13C3 = 286
      Probability for none of 3 balls white is = 286/969 =65/323

      So
      Probability that at least one for three balls drawn is white is = 1-286/969
      =686/969

4. The odds against manager X settling the wage dispute with the workers are 8:6 and odds in favour of manager Y settling the same dispute are 14:16
   a. Chance that neither will settle the dispute if they try independently
   b. What is the probability that the dispute will be settled?

Sol:

   The probability that it is dispute not settled by manager X is = 8/14

   The probability that it is dispute settled by manager X is = 1-8/14 = 6/14

   The probability that it is dispute not settled by manager Y is=14/30

   The probability that it is dispute settled by manager Y is=1-14/30 =6/30

a. Chance that neither will settle the dispute if they try independently

Probability setting disputes if they try independently
= 6/14X8/14 + 6/30X14/30 + 6/14X6/30
=48/196+84/900+36/900

b.what is the probability that the dispute will be settled?

6/14X6/30 = 36/420

5. The odds that person X speaking truth are 3:2 and the odds of the person Y speaks truth are 5:3. In what percentage of the cases are they likely to contradict each other?

Sol:
A : 3 :2 means that in 5 situation,
A told the True 3 times; as a fraction 3/5;
A told the lies in (5 - 3)/ 5 = 2/5,

B : 5 : 3 means that 5 +3 = 8 situation,
B told the True; in 5 out of 8.
As a fraction 5/8 and
B told lies in 3 out of 8 situations.
As a fraction 3/8

Both contradict each other when A told the True and B lied.
=3/5 x 3/8= 9/ 40 = 22.5 %

Or A lied and B told the True. As fractions: 2/5 x 5/8 = 10/40 = 25 %

Probability of Contradiction: 22.5 + 25 = 47.5 %:

6. A problem in statistics is given to three students A, B and C whose chances of solving atit are ½, ¾ and] ¼, respectively. What is the probability that the problem will be solved if all of them try independently.
<mark>Sol:</mark>
A=1/2
B=3/4
C=1/4
Probability that the problem will be solved if all of them try independently =
P(AUBUC)= P(A)+ P(B)+ P(C)- P(A∏B)- P(A∏B)- P(B∏C)- P(A∏C)+ P(A∏B∏C)
=1/2+3/4+1/4 - /2X3/4 - 3/4X1/4 - 1/2X1/4 - 1/2X1/4 - 1/2X3/4X1/4

7. In a certain town there are equal numbers of male and female residents. It is known that 5% and 20% are unemployed. If any unemployed person is picked up at random, what is the probability that:
    a. It is a female
    b. It is a male

Males = 5%
    Female = 20%
E1= Person being male P(E1) = ½

E2= Person being female P(E2) = ½
P(E/E1) = 5% =0.05
P(E/E2) = 20% =0.2

P(E2/E) female = P(E) X P(E/E2) / Σ P(E2) X P(E/Ei)

P(E) X P(E/E2) = P(E1) X P(E/E1) + P(E2) X P(E/E2)
=P(E)= 1/2X0.05 +1/2X0.2 = 0.125

P(E2/E) female = 1/2X0.2 / 0.125 = 4/5 = 0.8

P(E2/E) male = 1/2X0.05 / 0.125 = 0.025/0.125 = 0.2