**Probability Problems Explained**

**Q. What is the probability of drawing 2 cards of the same suite from a deck of cards?**

Ans:

There are 4 suits in a deck of cards: Clubs, Diamonds, Hearts and Spades.

Probability of drawing 2 cards of the same suite = 13C2

Since there are 4 such possibilities we need to multiply it by 4.

All possibilities of picking 2 cards of same suite = 4 x 13C2

Probability of drawing any 2 cards from a deck of cards = 52C2

P(drawing 2 cards of the same suite from a deck of cards) = **(4 x 13C2) / 52C2**

**Q. What is the probability of getting at least one 4 on rolling a fair die twice?**

Ans:

Here, the problem states *at least one 4* which means either of the flips should show a 4 or both the flips should show 4. Therefore, there are 3 possibilities:

1. 4 on the first throw and not a 4 on the second throw
2. Not a 4 on the first throw and 4 on the second throw
3. 4 on both the throws

P(at least one 4) = P(4 on first throw) x P(No 4 on second throw) +

P(No 4 on first throw) x P(4 on second throw) +

P(4 on first throw) x P(4 on second throw)

= (1/6 x 5/6) + (5/6 x 1/6) + (1/6 x 1/6) = **11/36**

*Alternative*

There is another shorter way to answer this. ‘At least one 4’ can also be interpreted as probability of no 4s subtracted from all the possibilities

P(at least one 4) = 1 – P(No 4s) = 1 – (5/6 x 5/6) = **11/36**

**Q. A bag has 100 cards numbered 1-100. Two cards are drawn at random from the bag. What is the probability that one of the numbers is double the other?**

Ans:

Possible outcomes/pairs = (1, 2), (2, 4), (3, 6), (4, 8)…………..(47, 94), (48, 96), (49, 98), (50, 100)

No. of possible outcomes = 50

Total no. of ways of drawing 2 cards from 100 cards = 100C2

P(drawing 2 cards where one number is double the other) = **50 / 100C2**

**Q. A bag has 8 coins (2 unfair coins and the rest, fair coins). The probability of getting head on an unfair coin is 0.6. Find the probability of getting 2 heads after drawing a coin from the bag and flipping it twice.**

Ans.

There can be 2 possibilities here:

1. Pick the fair coin and flip it twice
2. Pick the unfair coin and flip it twice

P(2 heads on flipping a coin drawn randomly from the bag) =

P(picking the fair coin) x 0.5 x 0.5 + P(picking the unfair coin) x 0.6 x 0.6 =

0.75 x (0.5)2 + 0.25 x (0.6)2 = 0.1875 + 0.09 = **0.2775**