**Probability**

1. If it rains on Saturday with probability 50%, and it rains on Sunday with probability 30%, what is the probability that it rains at some point throughout the weekend?

P(SA\_rain\*SU\_rain) + P(SA\_rain\*SU\_no\_rain) + P(SA\_no\_rain\*SU\_rain)

* (0.5 \* 0.3) + (0.5 \* 0.7) + (0.5 \* 0.3) = 0.6500

1. A Class of 45 students is randomly split into 3 practice groups of the same size. A pair of friends in the class really like to work together and hope they won’t end up in diﬀerent groups. What are the chances they’re assigned to the same group?
   * Assume the **1st friend** was the first to be assigned to a group, there are 14 empty spots, the probability our **2nd friend** is given one of these spots should be: **14 / 44**

**OR**

**Counting the number of ways our two friends end up in the same group, that team could be chosen in 3 ways. The other 13 students shall be chosen in C(43, 13) ways and the rest of the students may be assigned in C(30, 15) \* C(15, 15) ways.**

**So → 3 \* C(43, 13) / C(45, 15) =**

**(3 \* 43 \* 42 ... 31 / 13! ) / (45 \* 44 \* 43 ... 31 / 15!) = 3 \* 15! / 13! \* 44 \* 45 = 14 / 44**

1. Q3. A fair six-sided die is rolled twice. What is the probability of getting 1 on the ﬁrst roll and not getting 6 on the second roll?

A. 1/36

B. 1/18

C. 5/36

D. 1/6

E. ⅓

⅙ \* ⅚ = 5/36

1. A fair six-sided die is rolled 6 times. What is the probability that no two results are the same number?
   * 6/6 \* ⅚ \* 4/6 \* 3/6 \* 2/6 \* ⅙ = 0.0154

OR

6! / 6^6

1. In a regular deck of cards, there are 52 cards from 4 suits of 13 cards each: Spades, Hearts, Diamonds and Clubs. You draw a card from the deck, note down its suit, return it to the deck and reshuﬄe. You repeat this 5 times. What is the probability not a single Diamonds card was drawn?
   * ¼ \* 5 = 0.2373
2. A bag contains 5 balls: 4 black and 1 white. A ball is drawn from the bag and returned to it, then another ball is drawn. What is the probability both were of the same colour?

⅘ \* ⅘ + ⅕ \* ⅕ = 0.68

1. You have a deck of cards containing 26 black and 13 red cards. You pull out 2 cards, one after another, and check their colour. If both cards are the same colour, then a black card is added to the deck. However, if the cards are of diﬀerent colours, then a red card is used to replace them. Once the cards are taken out of the deck, they are not returned to the deck, and thus the number of cards keeps reducing. What is the likelihood the last card left in the deck is black?

A. 1.0

B. 0.8

C. 0.6

D. 0.5

E. 0.0

Answer = 0

Look at the extremes:

* If you pull two reds everytime, and a black is added every time, you will get down to 1 red and X amount of blacks. However, from then on, the only way for red to be removed is when two reds are pulled- which is impossible at this point.
* If you pull two blacks everytime, then eventually you will get down to 0 blacks, because the starting amount is even.
* Even if it were odd, a black can still be removed when there is 1 left- if the 1 black is pulled, and a red is pulled, the black is removed and just replaced with another red. So in all scenarios, a red remains.