**Basic Probability Questions**

**Question 1**

A driver passes through 3 traffic lights. The chance he/she will stop at the first is 1/2 , at the second 1/3 and at the third ¼ independently of what happens at any of the other lights. What is the probability that

i)     the driver makes the whole journey without being stopped at any of the lights

ii)      the driver is only stopped at the first and third lights

iii)     the driver is stopped at just one set of lights.

**Solutions**







Probability of not getting stopped at all three lights



Probability of only getting stopped at second lights



Probability of only getting stopped at third  lights



Probability of only getting stopped at third  lights



Probability of getting stopped at one lights only





**Question 2**

What is the probability of getting a number divisible by 3 in each of 3 throws of a dice?

**Solution**

numbers divisible by 3 : 3 and 6

probability of throwing 3 or 6:   

Each throw of a dice is an independent event.

probability of throwing 3 or 6 three times in a row



**Question 3**

Which are the following pairs of events are mutually exclusive?

i)      Two dice are thrown: A is the event the sum is 10, B is the event the sum is 11

ii)     A hand of two cards is dealt: A is the event that the hand includes at least one red card, B is the event that the hand includes at least one black card.

iii)      student is chosen from the class at random: A is the event that the student is female, B is the event that a student is left-handed.

**Solutions**

(i) is mutually exclusive. cant throw 10 and 11 in same throw of two dice.

(ii) not mutually exlusive: can have one red card and one black card.

(iii) not mutually exclusine: can have a lefthanded female

**Question 4**

The following contingency table shows the age and sex of derby winners

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **age =3** | **age =4** | **age =5** | **Total** |
| **Stallion** | 10 | 30 | 20 | **60** |
| **Filly** | 20 | 20 | 10 | **50** |
| **Total** | **30** | **50** | **30** | **110** |

A winner is chosen at random. Calculate the probability that

1. the horse is a filly,
2. the horse won as a 5-year old,
3. the horse was a stallion, given it won as a 3-year old,
4. the horse was a 4-year old, given it was a filly.

**Solutions**

110 derby winners. 50 winners were fillies.

answer (i) = 50/110 = **45.45 %**

30 winners were 5 years old

answer (ii) = 30/110 = **27.27%**

30 winners were three year olds. Of that 30, 10 were stallions.

answer (iii) = 10/30 = **33.33%**

 50 winners were fillies. Of that 50, 20 were 4 year olds

answer (iv) = 20/50 = **40%**

**Question 5**

A card is drawn at random from a standard pack of playing cards. It is an ace. What is the probability that it is the ace of diamonds?

**Solution**

* What is the probability the ace picked is the ace of diamonds (given that we **know** that it is an ace).
* Wording of this question is very important.
* There are four card suits ( hearts, diamonds, clubs, spades)
* The card has a '**one in four**' chance of being an ace of diamonds.