Q1. What is a probability distribution, exactly? If the values are meant to be random, how can you predict them at all?

 Probablity distribution is the distribution of data in such a way that they are distrubuted based on the probability of occurence of different outcomes in the experiment. The predicted values are the probability occurrence of the outcomes. They can be find out by using some probability density function formulae. This will give the prabability of occurrence of the outcome.

Q2. Is there a distinction between true random numbers and pseudo-random numbers, if there is one? Why are the latter considered “good enough”?

True random numbers are those randomly generated numbers from some kind of pysical phenomenon. The outputs of these true randome numbers cannot be determined, even if their internal structure and response history are known.

While, the Pseudo-random numbers are generated by using some sort of algorithms and the sequences of these numbers are completly predictable.

Q3. What are the two main factors that influence the behaviour of a "normal" probability distribution?

The factors are:

1) The probability occurrence value of an event must be between 0 and 1. Both 0 and 1 are inclusive.

2) The sum of the probabilities is equal to 1

This normal distribution has a bell shaped structure

This is because the probability distribution function is nothing but an area between the probabilty occrrence curve and horixontal x axis between some x-interval

Q4. Provide a real-life example of a normal distribution.

1) Playing Cards. There is a probability of getting a desired card when we randomly pick one out of 52. For example, the probability of picking up an ace in a 52 deck of cards is 4/52; since there are 4 aces in the deck. The odds of picking up any other card is therefore 52/52 – 4/52 = 48/52

2) Batting average in Cricket: Batting average in Cricket represents how many runs a batsman would score before getting out.

3) Weather forecast

Q5. In the short term, how can you expect a probability distribution to behave? What do you think will happen as the number of trials grows?

In short run lets take an example of a dice throws twice and we gather the probability of getting all the numbers from 1 to 6 in both the trials. We do the pairing and then we find the average and with these average we will find put the probability of occurrence of the mean number. If we plot this using histogram we find that it is normally distributed. This is refer to the probability distribution.

As the number of trials increases, there will no impact on the shape of the curve because at any how the probability of occurrence of an event wil lie between 0 and 1. Moreover, the graph will be wider based on the interval range.

Q6. What kind of object can be shuffled by using random.shuffle?

Those class objects which are mutable in nature those will be shuffled by using random.shuffle. Example: List of items

l=['a','b','c'] we can apply that operation in list

Q7. Describe the math package's general categories of functions.

These include trigonometric functions, representation functions, logarithmic functions, angle conversion functions, etc.

pow(x, y): Returns x raised to the power y

sqrt(x): Returns the square root of x

acos(x): Returns the arc cosine of x

asin(x): Returns the arc sine of x

Q8. What is the relationship between exponentiation and logarithms?

Logarithmic functions are the inverses of exponential functions. The inverse of the exponential function y = ax is x = ay. The logarithmic function y = logax is defined to be equivalent to the exponential equation x = ay.

A logarithm is an exponent which indicates to what power a base must be raised to produce a given number.

Q9. What are the three logarithmic functions that Python supports?

1) log(a,(Base)) : This function is used to compute the natural logarithm of 'a' with (Base e) . If 2 arguments are passed, it computes the logarithm of desired base of argument a, numerically value of log(a)/log(Base).

2) log2(a) : This function is used to compute the logarithm base 2 of a. Displays more accurate result than log(a,2).

3) log10(a) : This function is used to compute the logarithm base 10 of a. Displays more accurate result than log(a,10)