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

**Ans:** A probability distribution is a function under probability theory and statistics- one that gives us how probable different outcomes are in an experiment. It describes events in terms of their probabilities; this is out of all possible outcomes. The probability distribution for a random variable describes how the probabilities are distributed over the values of the random variable. ... For a discrete random variable, x, the probability distribution is defined by a probability mass function, denoted by f(x). In statistics, the "distribution function" of a random variable is a function that specifies the probability that the variable's observed value will lie in any given region of possible values. In a normal distribution, the mean, median, and mode are equal.

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

**Ans:** The difference between true random number generators (TRNGs) and pseudo-random number generators (PRNGs) is that TRNGs use an unpredictable physical means to generate numbers (like atmospheric noise), and PRNGs use mathematical algorithms (completely computer-generated).

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

**Ans:** The normal distribution has two parameters, the mean and standard deviation. The normal distribution does not have just one form. Instead, the shape changes based on the parameter values, as shown in the graphs below.

Mean weight grams: 100

Standard Deviation: 15

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

**Ans:** The normal distribution is the most important probability distribution in statistics because it fits many natural phenomena. For example, heights, blood pressure, measurement error, and IQ scores follow the normal distribution. It is also known as the Gaussian distribution and the bell curve.

* Height. Height of the population is the example of normal distribution. ...
* Rolling A Dice. A fair rolling of dice is also a good example of normal distribution. ...
* Tossing A Coin.
* IQ.
* Technical Stock Market.
* Income Distribution in Economy.
* Shoe Size.

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?

**Ans:** In statistics and probability analysis, the expected value is calculated by multiplying each of the possible outcomes by the likelihood each outcome will occur and then summing all those values.

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

**Ans:** To randomly shuffle elements of lists (list), strings (str) and tuples (tuple) in Python, use the random module. random provides shuffle () that shuffles the original list in place, and sample () that returns a new list that is randomly shuffled. sample () can also be used for strings and tuples.

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

**Ans:** The math module is a standard module in Python and is always available. To use mathematical functions under this module, you must import the module using import math.

Q8. What is the relationship between exponentiation and logarithms?

**Ans:** A logarithm is an exponent. Taking the logarithm of a number, one finds the exponent to which a certain value, known as a base, is raised to produce that number once more.

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

**Ans:** Three types of logarithms namely ln, log and Log.