Q1. A probability distribution is a mathematical function that describes the likelihood of different possible outcomes occurring in a random event. Although the individual values in a probability distribution are random, the distribution itself can be used to predict the probability of different outcomes occurring.

Q2. True random numbers are generated by truly random processes, such as radioactive decay or atmospheric noise, and are considered unpredictable. Pseudo-random numbers, on the other hand, are generated using deterministic algorithms and are not truly random. However, they are considered "good enough" for many applications because they exhibit statistical properties that are similar to true random numbers and are unpredictable enough for most practical purposes.

Q3. The two main factors that influence the behavior of a normal probability distribution are the mean and the standard deviation. The mean determines the center of the distribution, while the standard deviation determines the spread of the distribution.

Q4. A real-life example of a normal distribution is the distribution of heights or weights in a population. In general, most people will have heights or weights that fall close to the mean, with fewer people having heights or weights that are much higher or lower than the mean.

Q5. In the short term, a probability distribution may behave unpredictably due to the randomness of individual values. However, as the number of trials grows, the distribution will tend to converge to its expected value, meaning that the outcomes will become more predictable and follow the pattern of the distribution.

Q6. Lists can be shuffled by using random.shuffle.

Q7. The math package's general categories of functions include mathematical constants, mathematical functions, and numerical methods.

Q8. Exponentiation and logarithms are inverse operations. In other words, if x^y = z, then log\_x(z) = y.

Q9. The three logarithmic functions that Python supports are the natural logarithm (math.log), the base-10 logarithm (math.log10), and the arbitrary base logarithm (math.log2).