A reasonable distribution to use for the number of raindrops hitting a particular region measuring 5 square inches in t minutes would be the Poisson distribution. The Poisson distribution is often used to model events that occur randomly over a given interval of time or space, such as the number of raindrops falling in a specific area.

In the Poisson distribution, the average rate of events occurring (λ) is known, which in this case is 20 drops per square inch per minute. The probability mass function of the Poisson distribution is given by:

P(X = k) = (e^(-λ) \* λ^k) / k!

Where X represents the number of raindrops hitting the region, k is the number of events, and e is the mathematical constant approximately equal to 2.71828.

To compute the probability that the region has no raindrops in a given 3-second time interval, we need to convert the rate of 20 drops per square inch per minute to drops per 3 seconds. Since there are 60 seconds in a minute, the rate becomes:

20 drops per square inch per minute = (20/60) drops per square inch per second.

Therefore, the average rate of drops in a 3-second interval is (20/60) \* 3 = 1 drop.

Now, we can use the Poisson distribution to calculate the probability of having no raindrops in a 3-second interval:

P(X = 0) = (e^(-1) \* 1^0) / 0! = e^(-1) ≈ 0.3679

So, the probability that the region has no raindrops in a given 3-second time interval is approximately 0.3679.

X and Y do not have the same distribution. X follows a uniform distribution, where each day of the week has an equal probability of being selected. Since there are seven days of the week, P(X = i) = 1/7 for i = 1, 2, ..., 7.

On the other hand, Y represents the next day after X, which means Y depends on the value of X. The distribution of Y will not be uniform because certain days of the week have different probabilities of being the next day, depending on the starting day X.

For example, if X is Monday (1), then Y can be Tuesday (2) with a probability of 1. However, if X is Sunday (7), then Y can only be Monday (1) with a probability of 1. Therefore, the distribution of Y will depend on the starting day X, and it will not be the same as the uniform distribution of X.