Qs.1. b) The classification results of the Qs.1. a is as the following:

* Gaussian NB result is ["virginica"].
* Multinomial NB result is also ["virginica"].
* Bernoulli NB result is ["setosa"].
* **Gaussian Naive Bayes:**
* In Gaussian Naive Bayes, continuous values associated with each feature are assumed to be distributed according to a Gaussian distribution.
* A Gaussian distribution is also called Normal distribution.
* When plotted, it gives a bell-shaped curve which is symmetric about the mean of the feature values.
* The likelihood of the features is assumed to be Gaussian, hence, conditional probability is given by:



* **Multinomial Naive Bayes**:
* Feature vectors represent the frequencies with which certain events have been generated by a **multinomial distribution**.
* This is the event model typically used for document classification.
* MLE: Pi = (∑Xi)/N; N is the total number of events.
* **Bernoulli Naive Bayes**:
* In the multivariate Bernoulli event model, features are independent Booleans (binary variables) describing inputs.
* Like the multinomial model, this model is popular for document classification tasks, where binary term occurrence (i.e., a word occurs in a document or not) features are used rather than term frequencies (i.e., frequency of a word in the document).
* PDF, P(x)=px(1-p)1-x , where p is the probability of success.

**Comments on difference in results**

* Gaussian NB correctly classifies the species class and here the result is “virginica”.
* It has high accuracy as compared to the other NB classifiers.
* The Multinominal NB classifier classifies the species as “virginica”.
* It depends on the counts of the multiple features that occur.
* The Bernoulli NB classifier classifies the species as “setosa”.
* Its result is different from the rest two NB classifiers.
* It needs samples to be denoted as binary-valued feature vectors and here these aren’t in binary form.