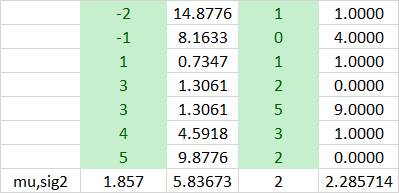
# Q1)

Blue:



: :

Red:

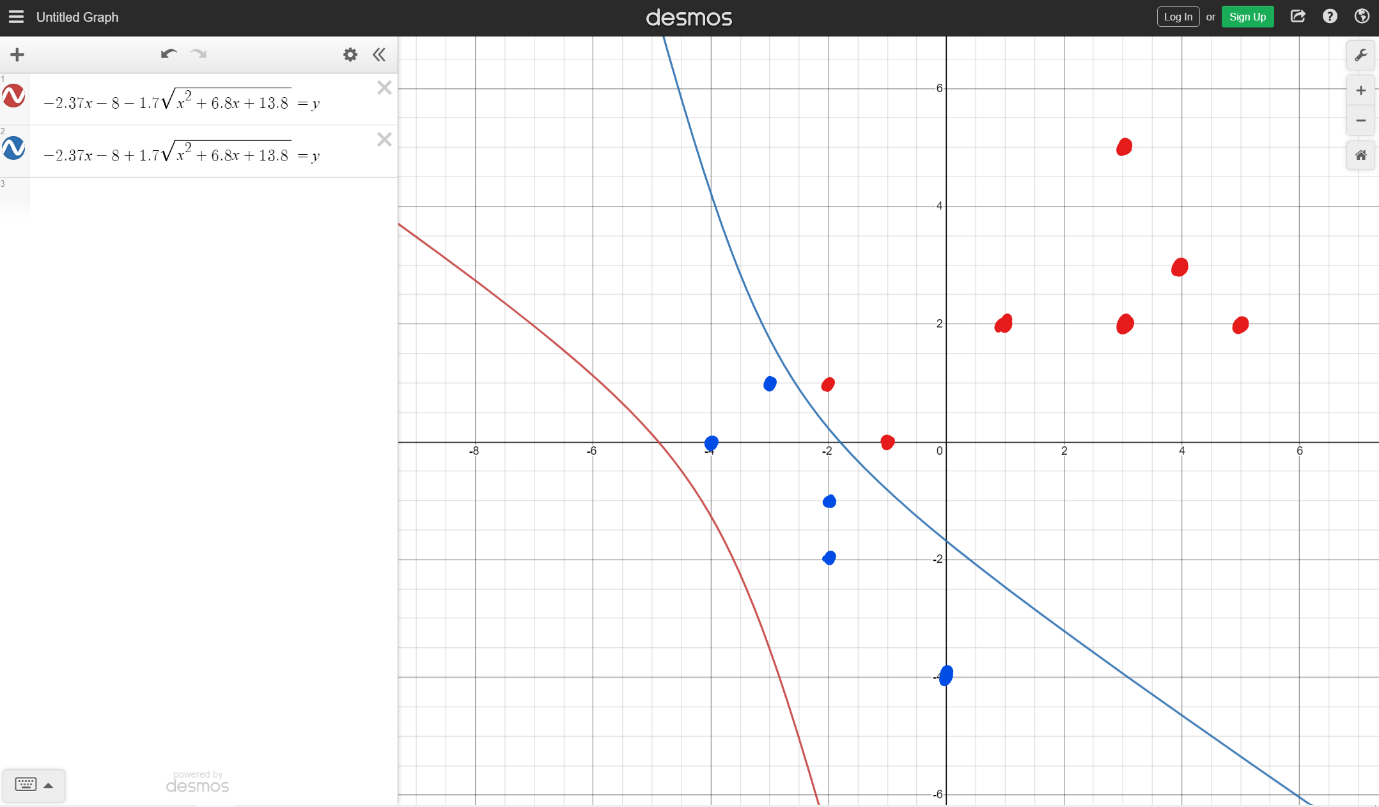


: :

Normal:

Bayes Rule:

Hyperbolic equation:



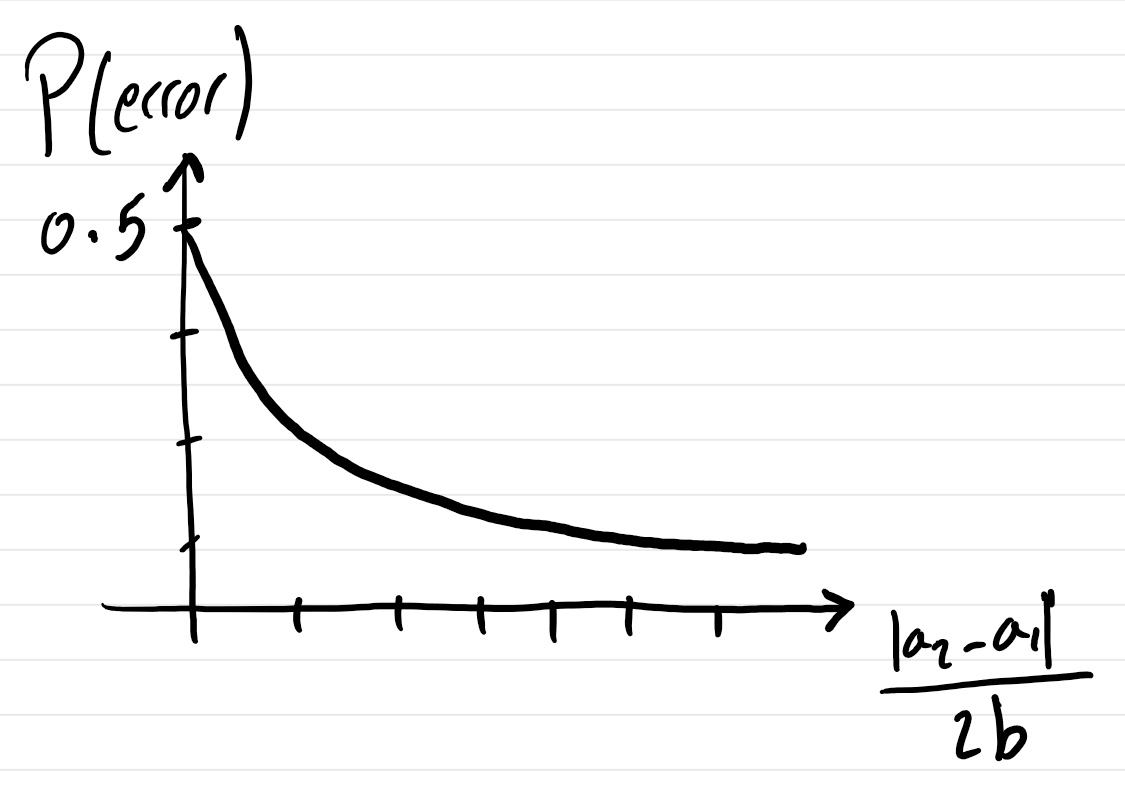
# Q2)

## Part a)

Decision boundary is at .

## Part b)

The function is drawn bellow.



## Part c)

It is obvious that and it happens at which occurs at . This occurs at two situations:

1. When means the two distributions are the same.

2. When means both distributions are flat.

# Q3)

## Part a)

## Part b)

Likelihood function

## Part c)

MLE estimator

The optimal value of maximizes the MLE is .

## Part d)

Therefore, the estimator  is just the sample mean of the  observations in the sample.

# Q4)

## Part a)

and

MAP estimation for :

MAP:

## Part b)

Likelihood

Density of

Two equations are the same. So, MAP estimate of is appropriate.