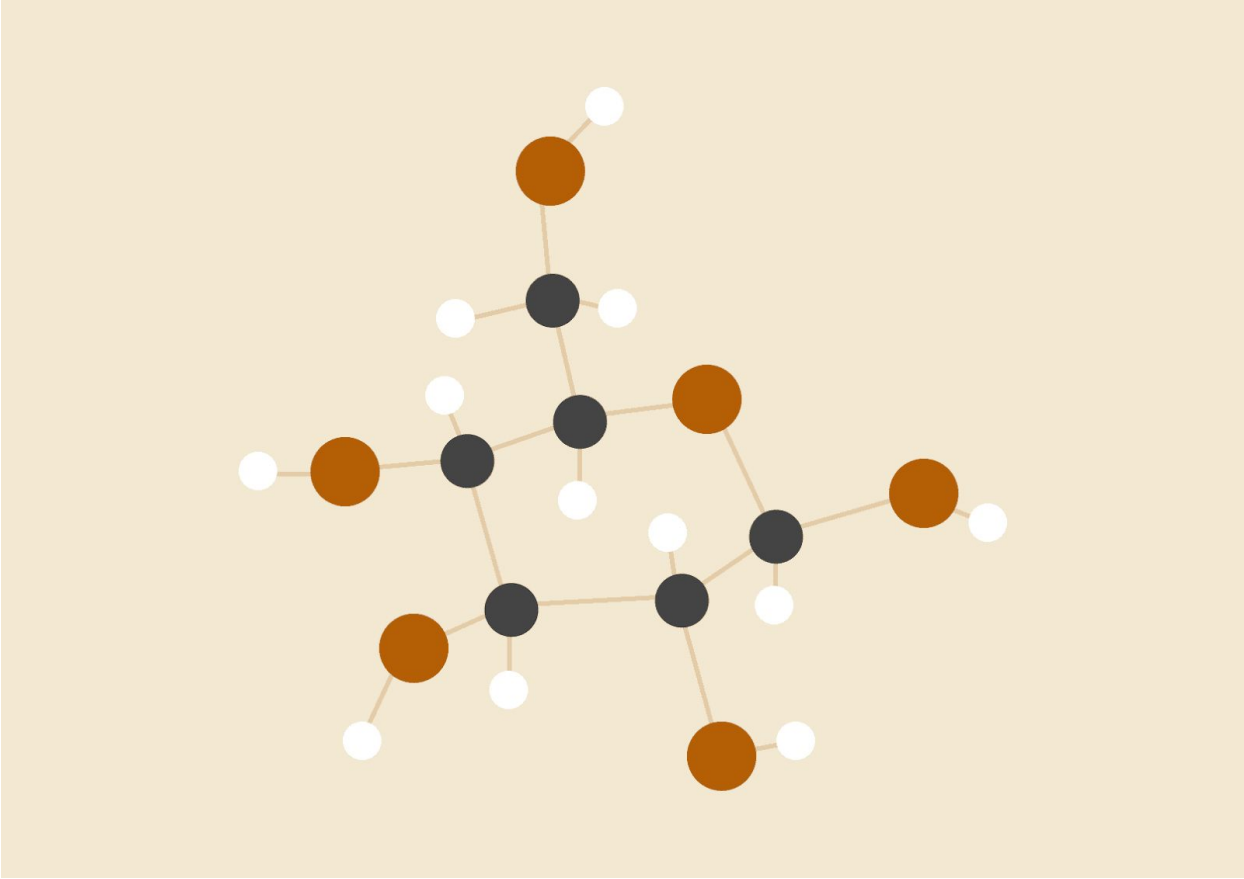
Artificial Intelligence-
K-Means Clustering REPORT

On the MINST Dataset



Kareem Hossam Mohamed

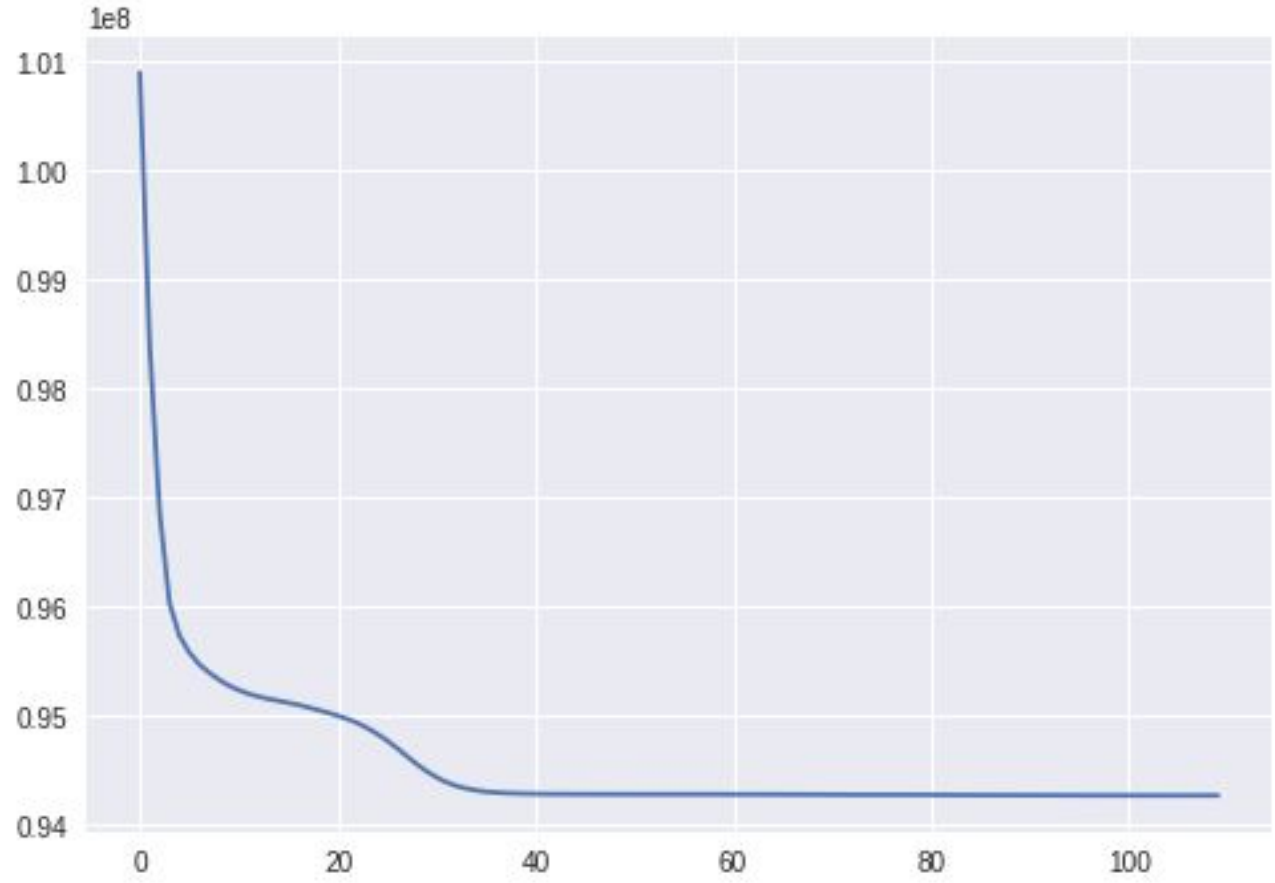
3317

1- K = 10:

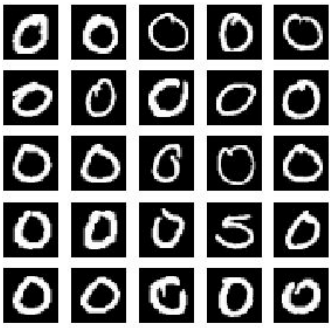
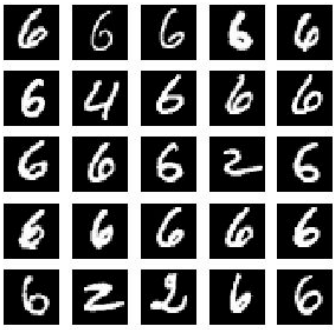
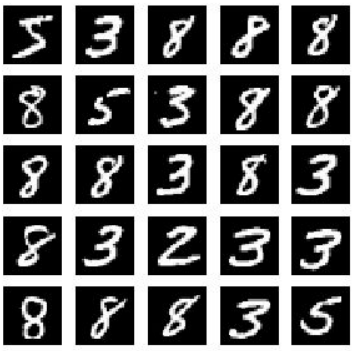
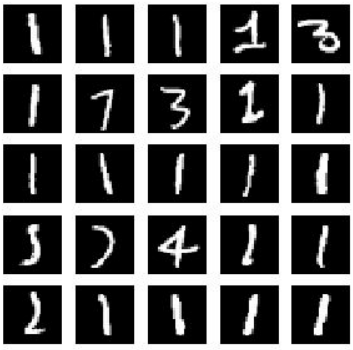
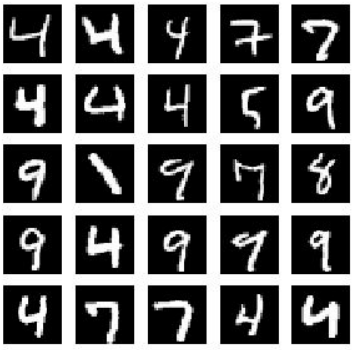
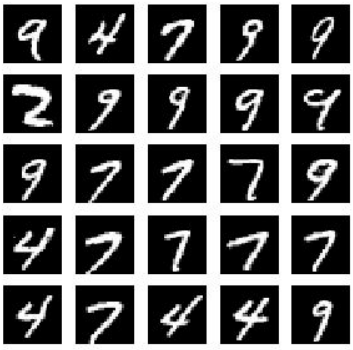
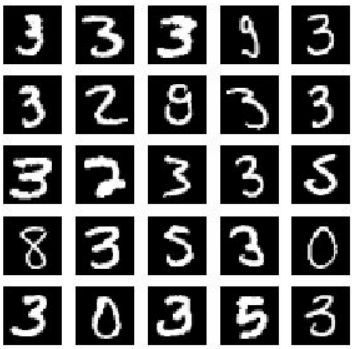
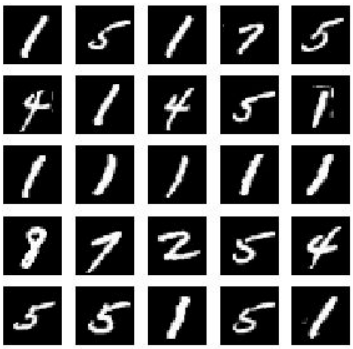
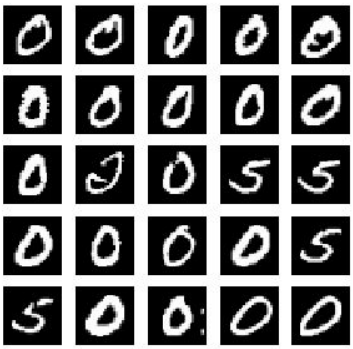
Iterations: 110

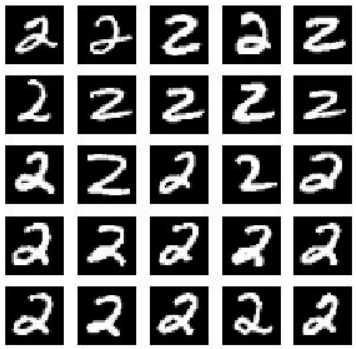
Accuracy: 64.4%

Loss:



The Following Clusters were Made:

Cluster: 0 Label: 0 	Cluster: 1 Label: 6 	Cluster: 2 Label: 8 
Cluster: 3 Label: 1 	Cluster: 4 Label: 4 	Cluster: 5 Label: 7 
Cluster: 6 Label: 3 	Cluster: 7 Label: 1 	Cluster: 8 Label: 0 

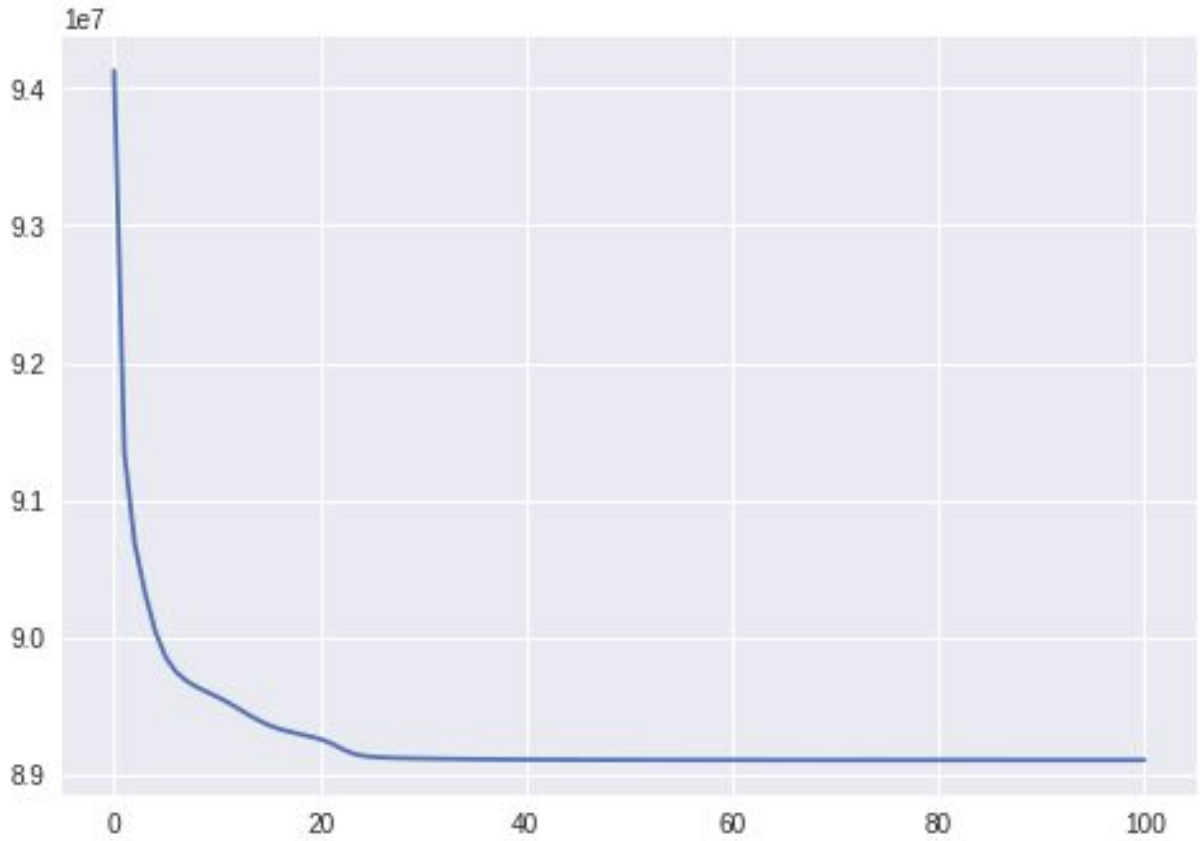
Cluster: 9 Label: 2 		

2- K = 20 (K > Number of Labels):

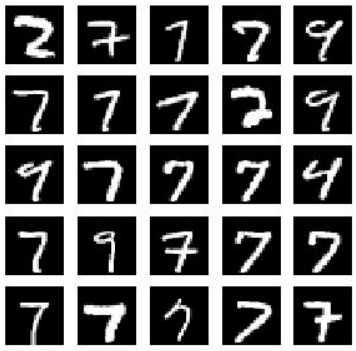
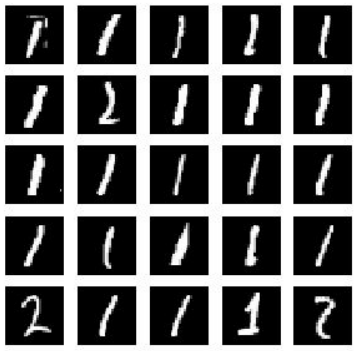
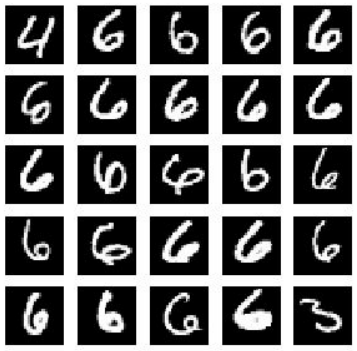
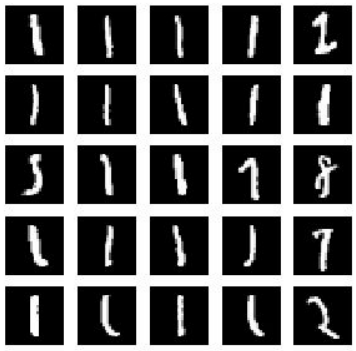
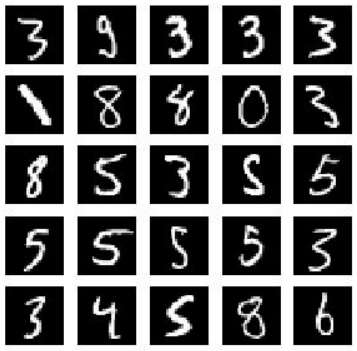
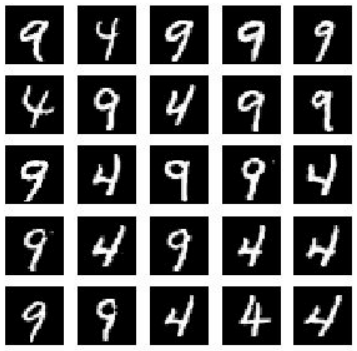
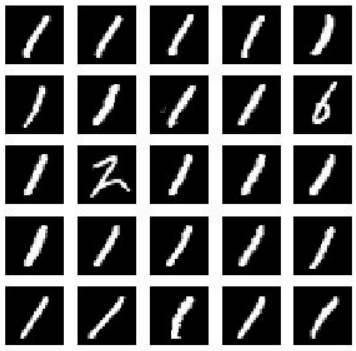
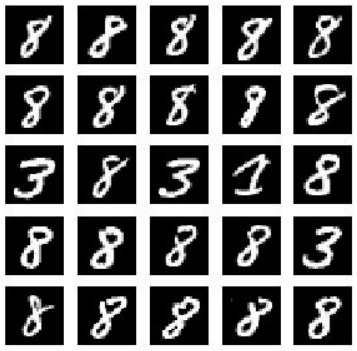
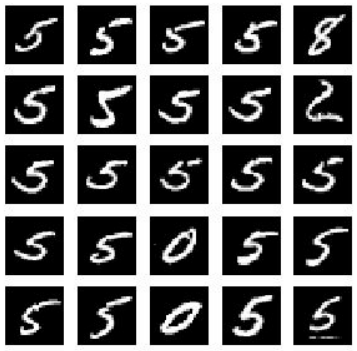
Iteration: 100

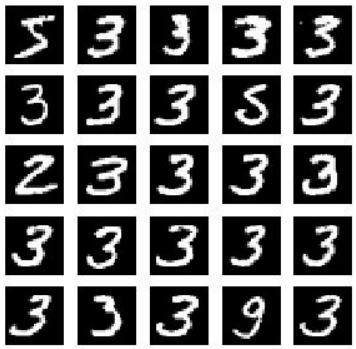
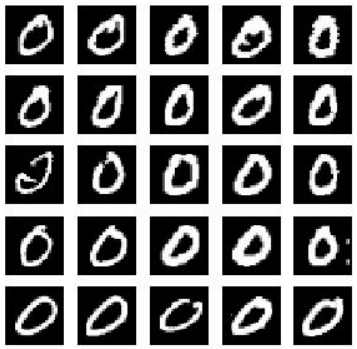
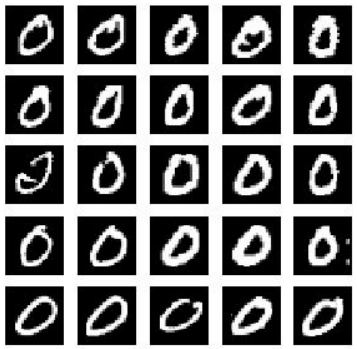
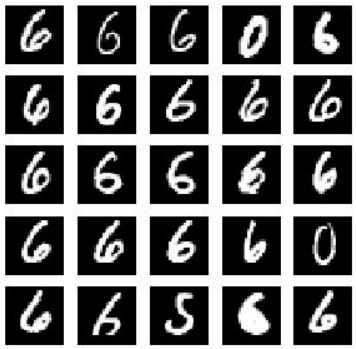
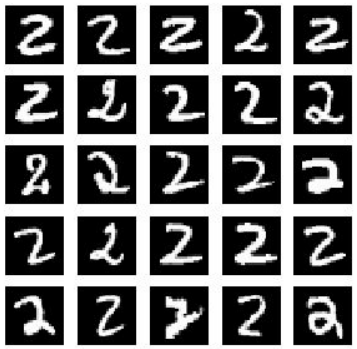
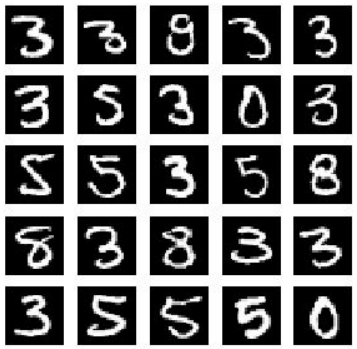
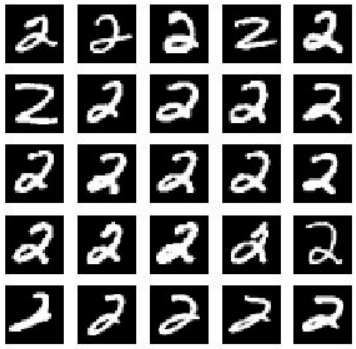
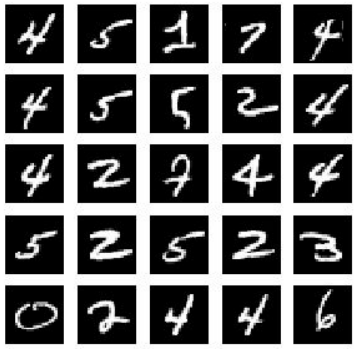
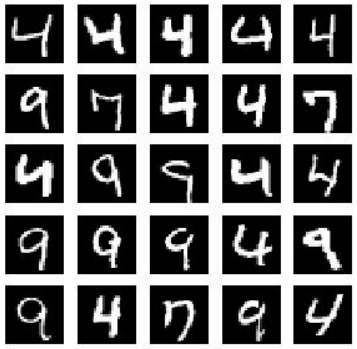
Accuracy: 73.2%

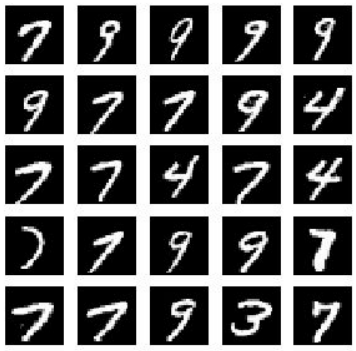
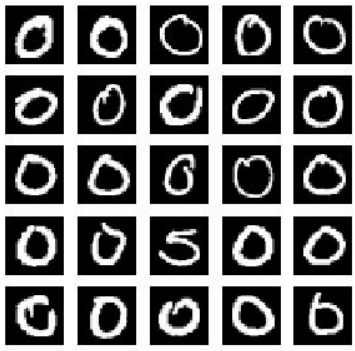
Loss:



The following clusters were made:

Cluster: 0 Label: 7 	Cluster: 1 Label: 1 	Cluster: 2 Label: 6 
Cluster: 3 Label: 1 	Cluster: 4 Label: 3 	Cluster: 5 Label: 9 
Cluster: 6 Label: 1 	Cluster: 7 Label: 8 	Cluster: 8 Label: 5 

Cluster: 9 Label: 3 	Cluster: 10 Label: 0 	Cluster: 11 Label: 8 
Cluster: 12 Label: 6 	Cluster: 13 Label: 2 	Cluster: 14 Label: 3 
Cluster: 15 Label: 2 	Cluster: 16 Label: 4 	Cluster: 17 Label: 4 

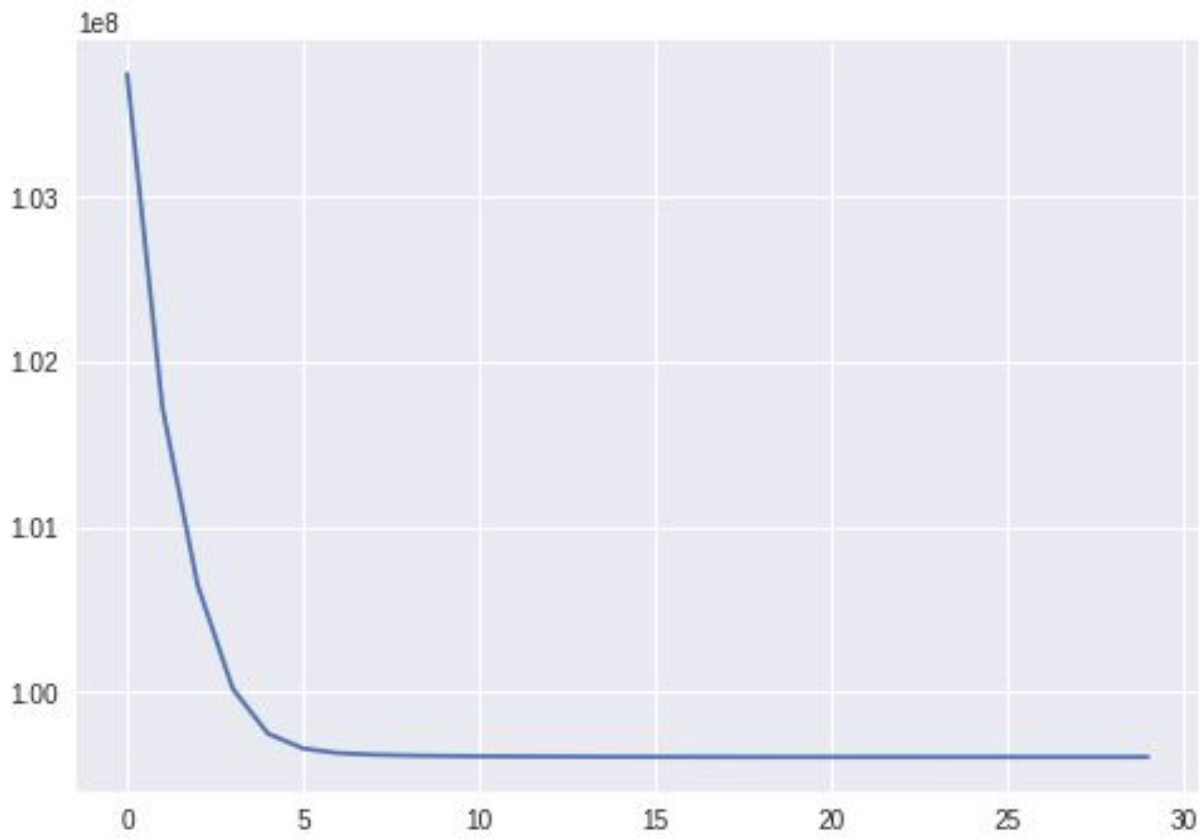
Cluster: 18 Label: 7	Cluster: 19 Label: 0	
		

3- K = 5 (K < Number of Labels):

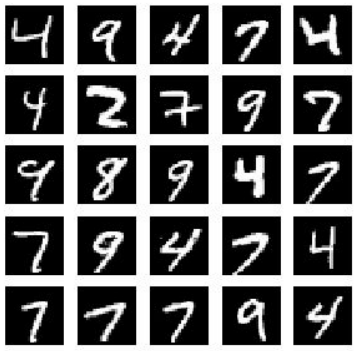
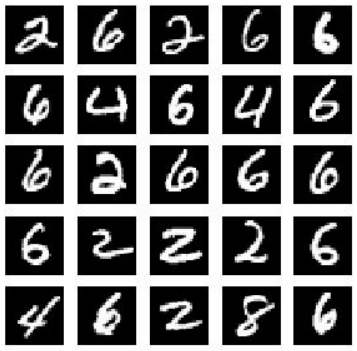
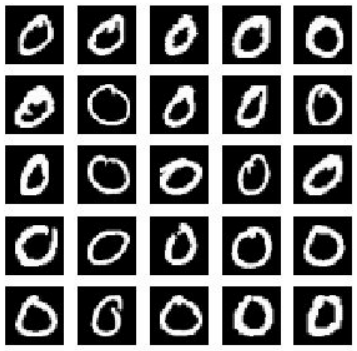
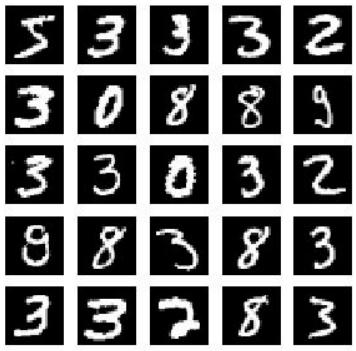
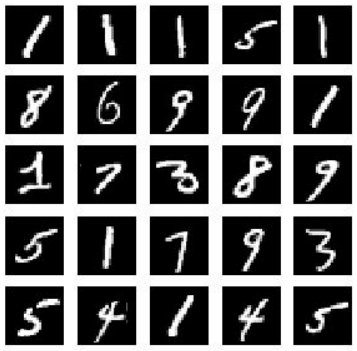
Iteration: 29

Accuracy: 51.6%

Loss:



The Following Clusters were made:

Cluster: 0 Label: 7 	Cluster: 1 Label: 6 	Cluster: 2 Label: 0 
Cluster: 3 Label: 3 	Cluster: 4 Label: 1 	

RESULTS:

We notice that as we increase K, It gives us higher accuracy because more variations are clustered together, the downside being that gives slower performance (i.e. it takes more iterations to converge)