Q8 Step 1

find $\|x_1 - z_1\|_2 \ldots \quad \|x_1 - z_k\|_2$

for all $x_1, x_2 \ldots x_N \in R^n$

Then find minimum

subtraction $\longrightarrow$ ~~n~~ n

norm $\longrightarrow 2n$

Minimum $\longrightarrow k$

$\Rightarrow$ Total operations per x_i for i in $1, 2 \ldots \bar{N}$

$= 3n \times k$

$\Rightarrow$ Total ~~time~~ computation complexity $= O(nKN)$

(b) Step 2 $\quad$ for all $i \in 1, 2, \ldots k$

$$z_i = \frac{1}{|S_i|} \sum x_j \cdot [c_j = i]$$

Summation $= nN$

Divisions $= K \times n$

Total complexity $= nN + kn$

$\approx O(nN)$ ~~∗~~

$N > k$

ⅵ Total No. of computations

$$= 3nKN + nN + Kn$$

⇒ for 10 iterations computations are

$$= 10(3nKN + nN + Kn)$$

$$\approx 30nKN + 10nN + 10Kn$$