**Part (a)**

In the context of K-means clustering, the following equation 12.18 refers to the fact that the cluster means are the constants that minimizes the squared deviations for each feature. In K means, it means for each cluster k with nk, the constant which is mean in this case minimizes the within cluster sum of squared deviations from the mean. We know that:

∑​(xij​−μkj​)=0

μkj​=1 / nk​ ​i∈Ck​∑​xij​

hence proved that cluster means are the values that minimize the sum of squared deviations from each cluster.

**Part (b)**

**K-means clustering algorithm (Algorithm 12.2) decreases the objective**

In the K-means algorithm, at each iteration, the centroid of the cluster is computed. As we know, the mean minimizes the sum of squared deviations of the observations from the centroid, this implies that at each iteration, objective is minimized with respect to the centroid locations.