1. The leave-one-out error for the first instance is 0. Since, first instance is not a support vector, and therefore does not affect the optimal hyper-plane if left out.

For instances 2 and 3, we firstly calculate slack variables, and. We also know that the maximum length of feature vector is 1, that is,. We can then calculate the necessary conditions of leave one out error as:;. Thus, instance 2 cannot produce a leave-one-out error, while instance 3 could produce a leave-one-out error.

Thus, the upper bound of leave-one-out error for instance 1 and 2 is 0, the upper bound of leave-one-out error for instance 3 is 1.

1. From the dual training algorithm, in each iteration of the algorithm, we will add 1 to if. From the problem statement, we know that any two feature vectors are orthogonal, then we know that the summation,, could be simply expressed as . That is, we are adding 1 to only when. We notice that when starts at 0, the inequality will be satisfied, and if, the inequality will never be satisfied. Therefore we will add 1 to, and never change the values in the later iterations. Thus, the corresponding to is 1, for all.