```python
In [1]: import numpy as np
         from sklearn import svm
         import matplotlib.pyplot as plt
         import pandas as pd
```

```python
In [2]:  data_train = pd.read_csv("data_train.csv")
         data_test = pd.read_csv("data_test.csv")
         X = data_train[['intensity','symmetry']]
```

```python
In [3]:  y0 = np.where(data_train["digit"] ==0, 1 ,-1)
         Clist = [-2,-1,0,1,2]
```

```python
In [4]:  d = []
         for c in Clist:
             result = svm.SVC(C = 10**c, kernel = "rbf", gamma = 80).fit(X,y0)
             K = [ind for ind, coef in  enumerate(abs(result.dual_coef_[0])) if coef > 0 and 
             d = d + [1/abs(result.decision_function(result.support_vectors_[K])).mean()]
```

```python
In [5]:  import seaborn as sns; sns.set()
         import matplotlib.pyplot as plt
         df=pd.DataFrame({'log10(C)': Clist, 'distance': d})
         ax = sns.scatterplot(x='log10(C)', y='distance',data=df)
```
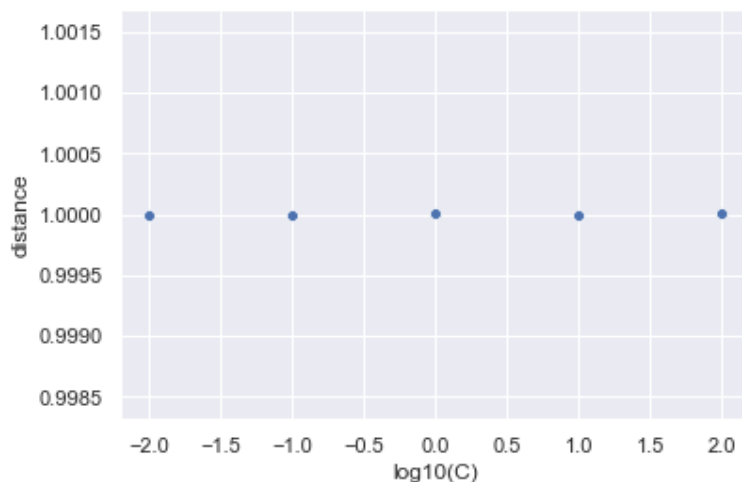


```python
In [6]:  print(d)
```

[0.9999999999909325, 0.9999857911256719, 1.0000119984722506, 0.9999920492162087, 1.
000000485322164]

Q15: The distance to the hyperplane always is 1.