# SENG 474 Assignment 2 Part 1

# Question 1

1. Following the SVM seperator

A picture containing screenshot, line, diagram, colorfulness

Description automatically generated

1. Margin = 1/|w| = 0.5
2. Figure 2 I have the following SVM separator:

A picture containing screenshot, line, diagram, plot

Description automatically generated

Tt has a greater margin. Since margin = 2 / |w|, we know that |w| will be smaller for greater margin. Hence ½(w^2) will smaller.

1. Using ruler, we can see that Margin is 4 times bigger than the original margin. New margin ~ 2.

Since Margin = 1/|w|, |w| = 1/Margin = 1/2 = 0.5

Hence w ~ 0.5

1. Here are the 2 SVM separator. The Red line represent SVM separator with C=1. This allows for some mismatches, like one red dot which is an outlier. But the green line represent SVM separator with C=0 which doesn’t tolerate outliers. The SVM with C=1 is better.

A diagram of lines and dots

Description automatically generated with low confidence

1. We will the red line separator because its more general. It doesn’t overfit and can be applied to a lot of the cases. But the green line separator which perfectly separates the data is overfitting as it has no training error. This means it might not perform well with test data as its not general.