

- (c)
- $(-1, 1)$: red
 - $(2, 2)$: blue
 - $(3, 8)$: blue
 - $(0, 0)$: red

(d) The decision boundary is $(1+x_1)^2 + (2-x_2)^2 = 4$.
Reorganize, we get:

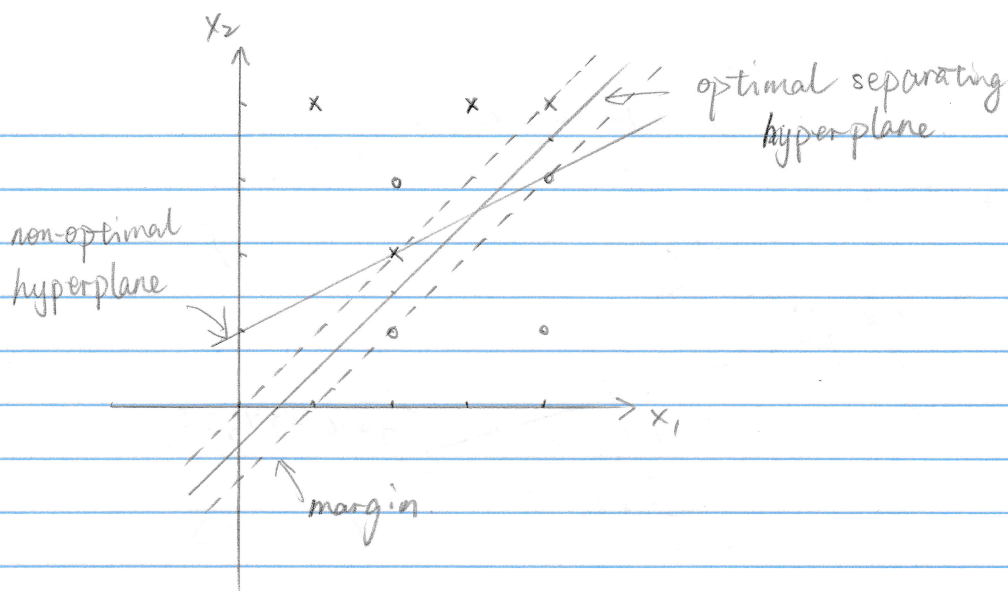
$$x_1^2 + 2x_1 + x_2^2 - 4x_2 + 1 = 0$$

This is linear in x_1, x_1^2, x_2, x_2^2

3.

(a)

(b)



The separating hyperplane is: $x_1 - x_2 - \frac{1}{2} = 0$.

(c)

Classify to red if $x_1 - x_2 - \frac{1}{2} < 0$.

Classify to blue if $x_1 - x_2 - \frac{1}{2} > 0$.

(d)

see graph.

(e)

Support vectors: $(2, 1)$, $(4, 3)$, $(2, 2)$, $(4, 4)$

(f)

Small movement of observation would not touch margin.

(g)

non-optimal hyperplane: $x_1 - 2x_2 + 2 = 0$.

(h)

New observation: $(2, 3)$ - blue