ML HW 4

Reid Glaze.

1(a)

$$\|x - \mu_1\| = \|x - \mu_2\|$$

$$\|x\| + \|\mu_1\| - 2\mu_1 x = \|x\| + \|\mu_2\| - 2\mu_2 x$$

$$2(\mu_1 - \mu_2)x + \|\mu_2\| - \|\mu_1\| = 0$$

$$(\mu_1 - \mu_2)x + \frac{(\|\mu_2\| - \|\mu_1\|)}{2} = 0$$

$\hat{y}(x) = w^T x + w_0$

with $w^T = \mu_1 - \mu_2$

$$w_0 = \frac{(\|\mu_2\| - \|\mu_1\|)}{2} = 0$$

$\mu_1 = \mu_.$
$\mu_{-1} = \mu_2$

1b)

$$(\mu_. - \mu_2)x + \frac{(\|\mu_2\| - \|\mu_.\|)}{2} = 0$$

$$2(\mu_. - \mu_2)x + \|\mu_2\| - \|\mu_.\| = 0$$

$$2\mu_. x - 2\mu_2 x + \|\mu_2\| - \|\mu_.\| = 0$$

$$\|\mu_.\| - 2\mu_. x = \|\mu_2\| - 2\mu_2 x$$

$$\|x - \mu_.\| = \|x - \mu_2\|$$

line between $\mu_.$ & μ_2 perpendicular to the hyperplane