Quiz 10 Solutions

Let's solve this using a system of equations.

From the graph we can see that $(-1,-1)$ $(1,-1)$ and $(0,1)$ are our support vectors.

$$w \cdot x + b = -1$$

$$w \cdot x + b = +1$$

$$(w_1, w_2) \cdot (-1,-1) + b = -1$$

$$(w_1, w_2) \cdot (1,-1) + b = 1$$

$$(w_1, w_2) \cdot (0,1) + b = 1$$

$-w_1 - w_2 + b = -1$ (1)

$w_1 - w_2 + b = 1$ (2)

$w_2 + b = 1 \longrightarrow b = 1 - w_2$ (3)

(3) into (2) $\longrightarrow w_1 - w_2 + 1 - w_2 = 1$

$w_1 - 2w_2 = 0$

$w_1 = 2w_2$

(3) & (2) into (1)

$\longrightarrow -2w_2 - w_2 + 1 - w_2 = -1$

$-4w_2 = -2$

$w_2 = \frac{1}{2}$

$w_1 = 1$

$b = \frac{1}{2}$