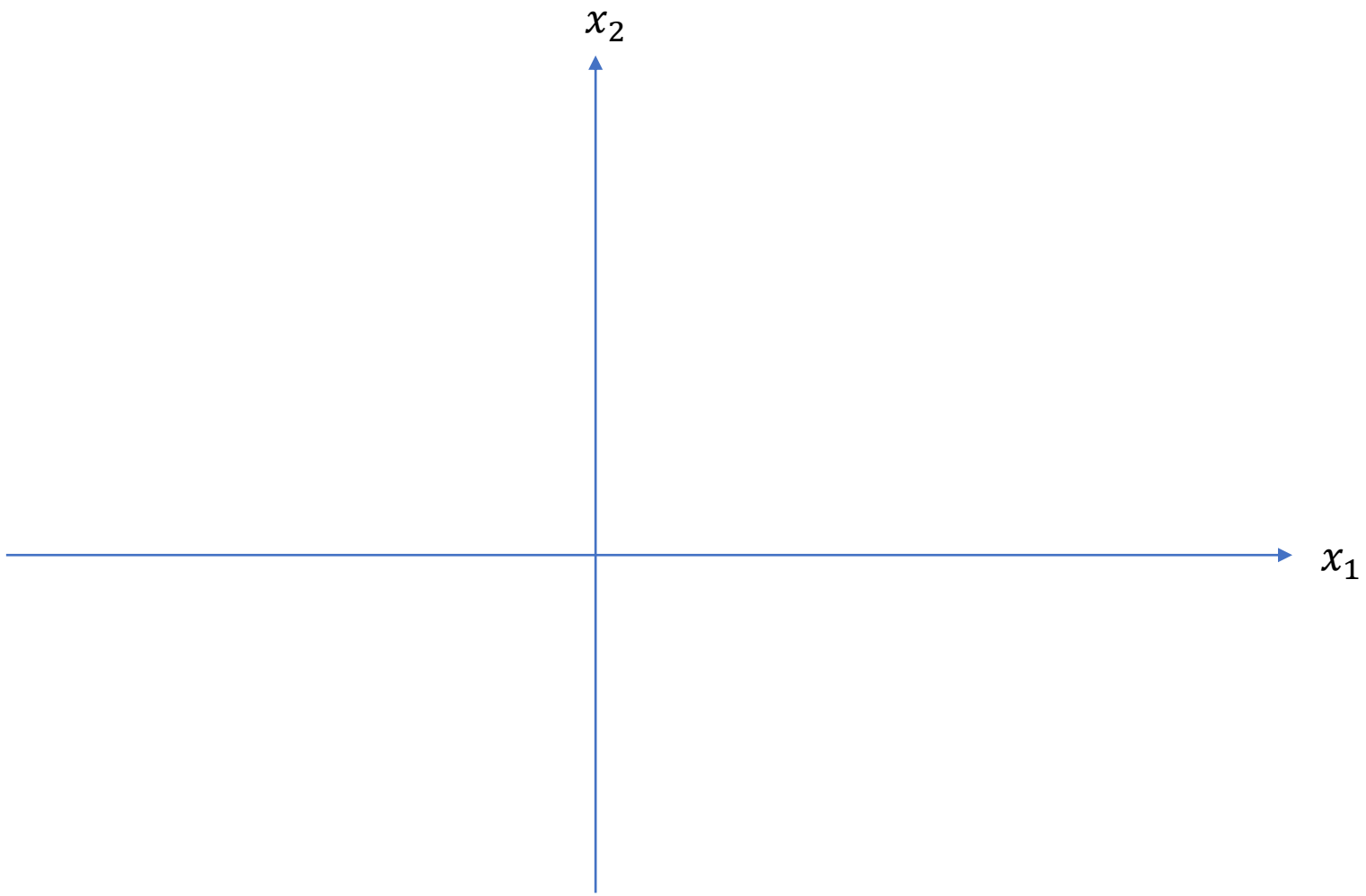
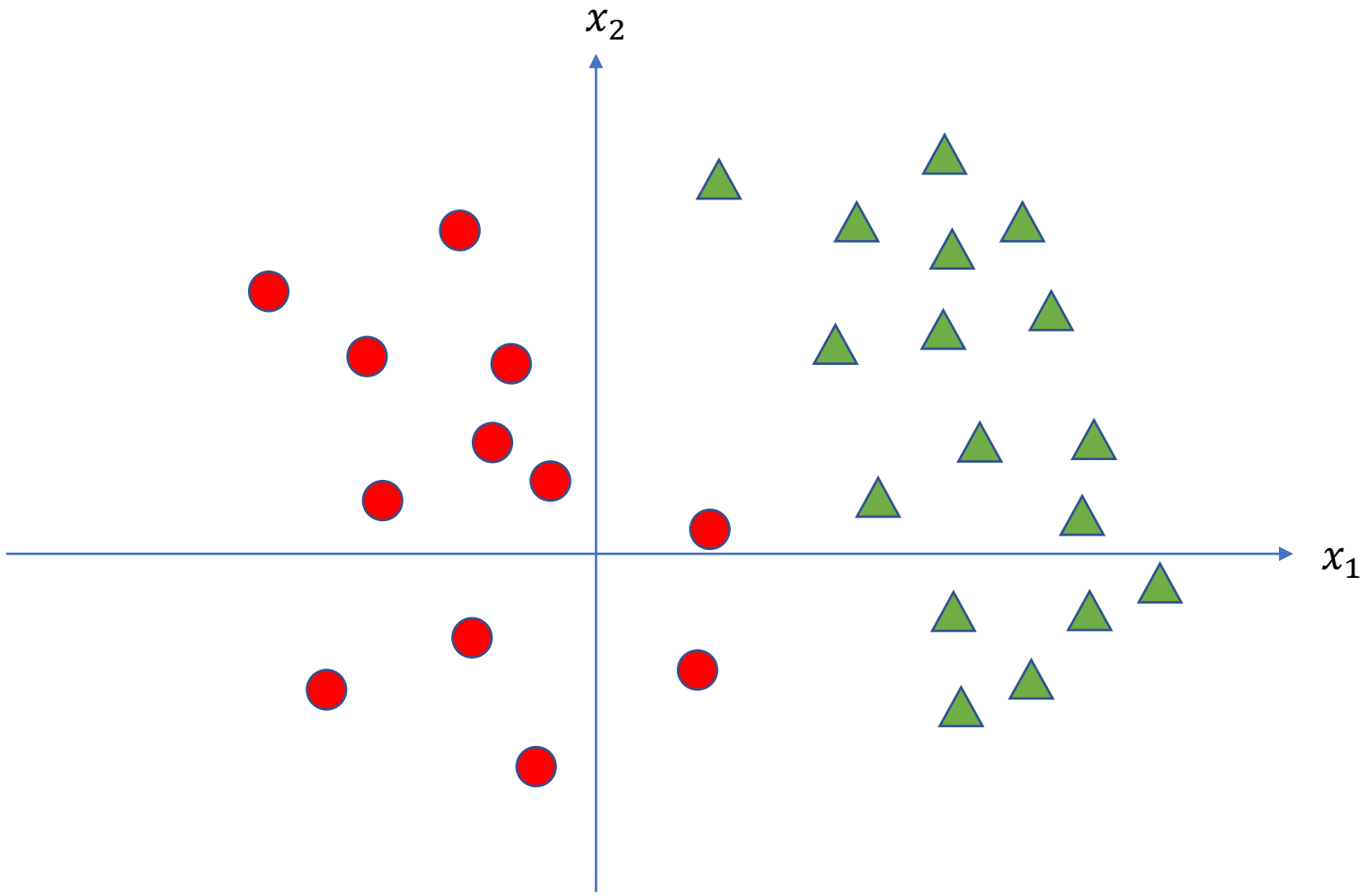
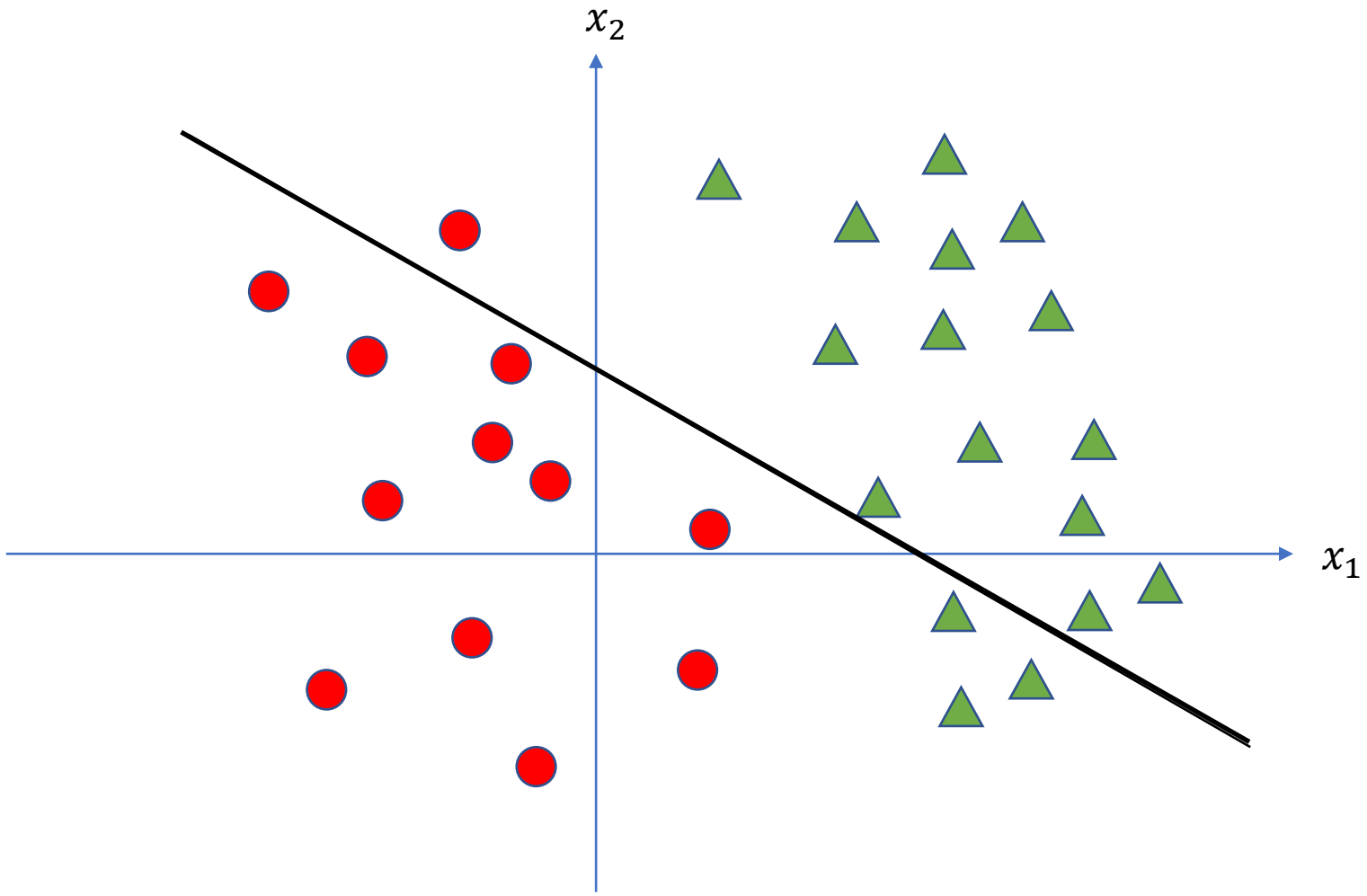

x_2
x_1


x_2
x_1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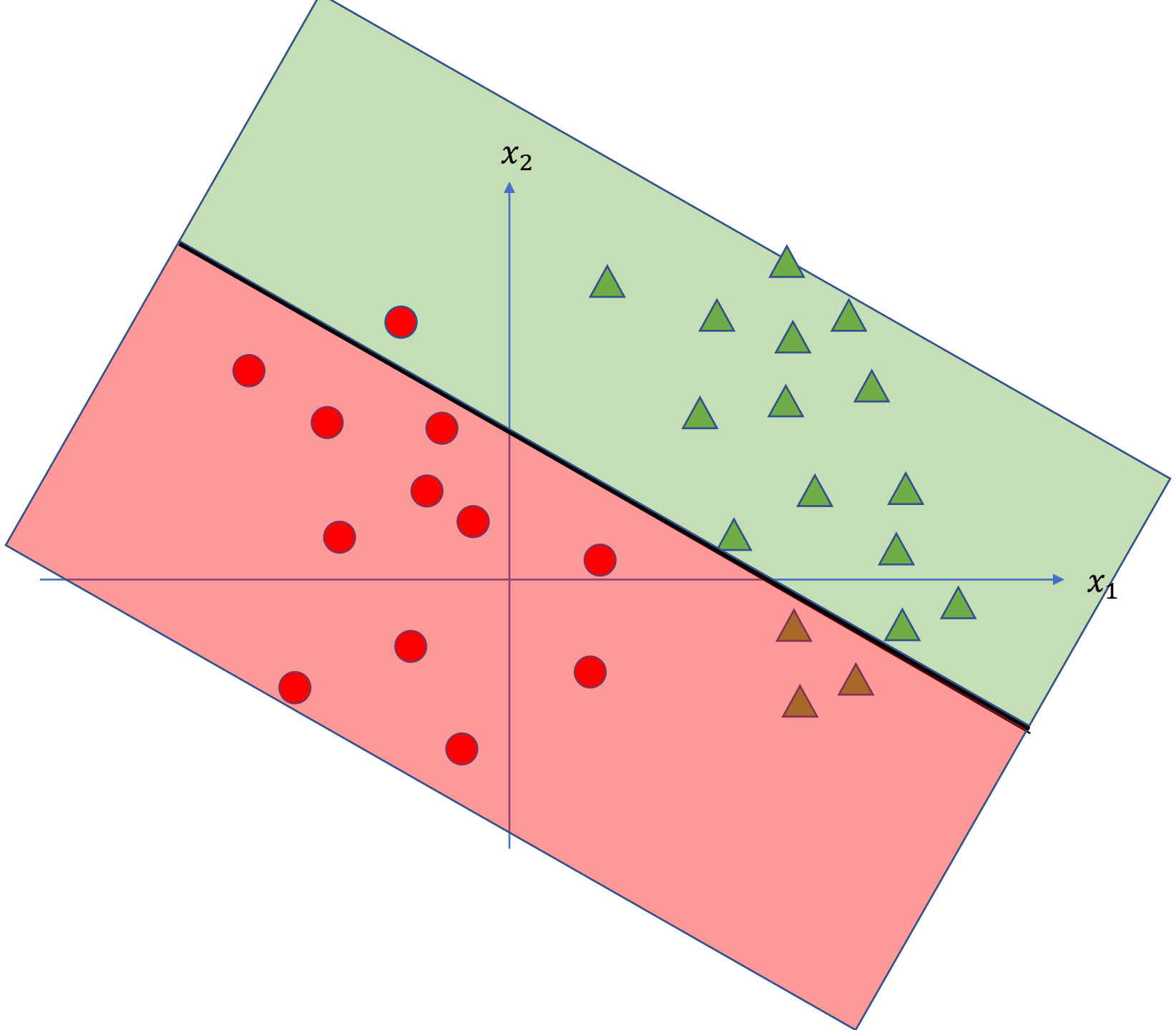
x_1

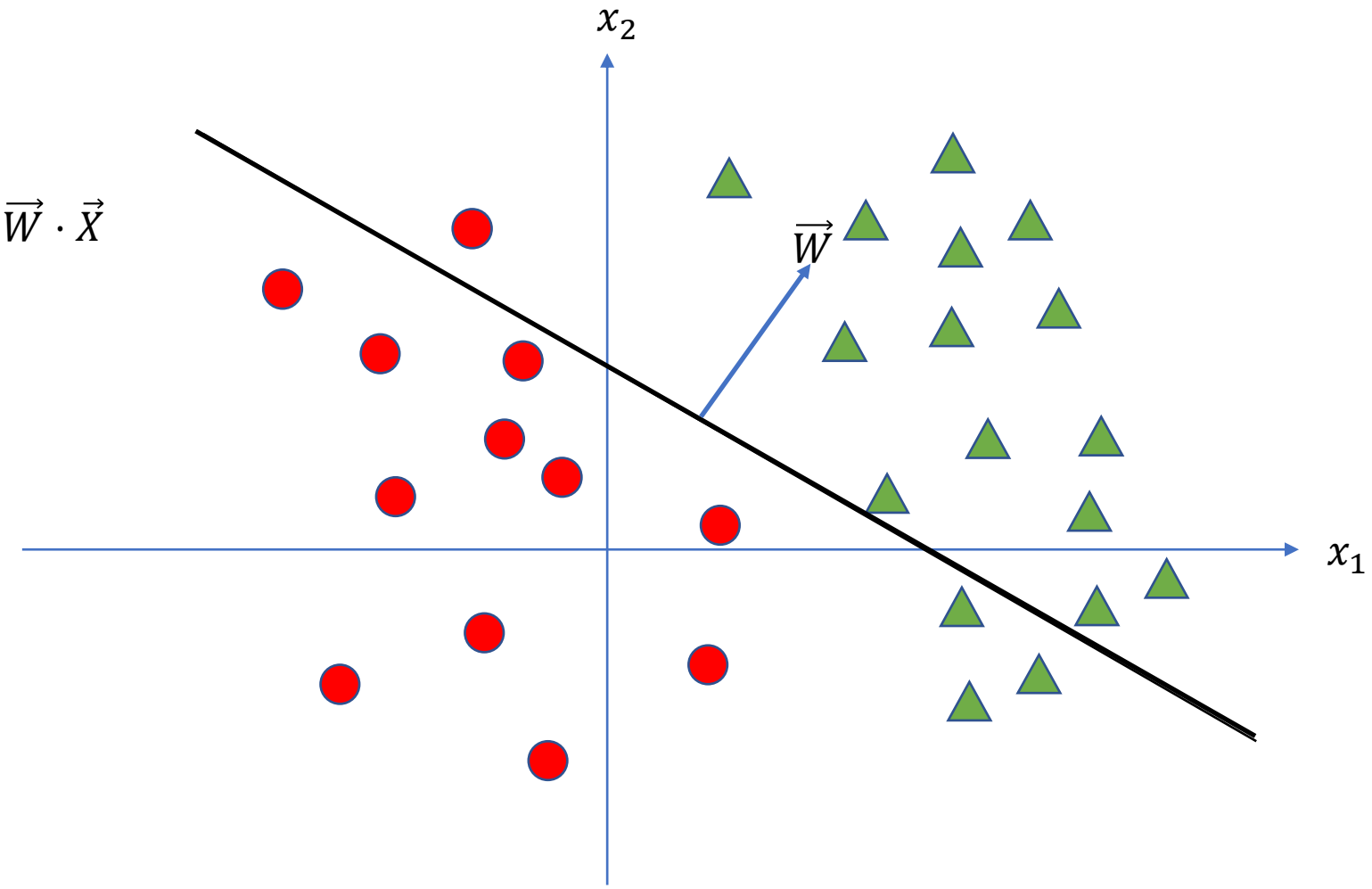

x_2
x_1

Prediction:

$$z = \vec{w} \cdot \vec{x} + b$$

$$z = \begin{bmatrix} w_1 & w_2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + b$$

$$z = \begin{bmatrix} b & w_1 & w_2 \end{bmatrix} \begin{bmatrix} 1 \\ x_1 \\ x_2 \end{bmatrix} = \vec{W} \cdot \vec{X}$$



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$$\hat{y} = \Phi(z) = \text{sgn}\,(z) = \begin{cases} -1, z \leq 0 \\ +1, z > 0 \end{cases}$$

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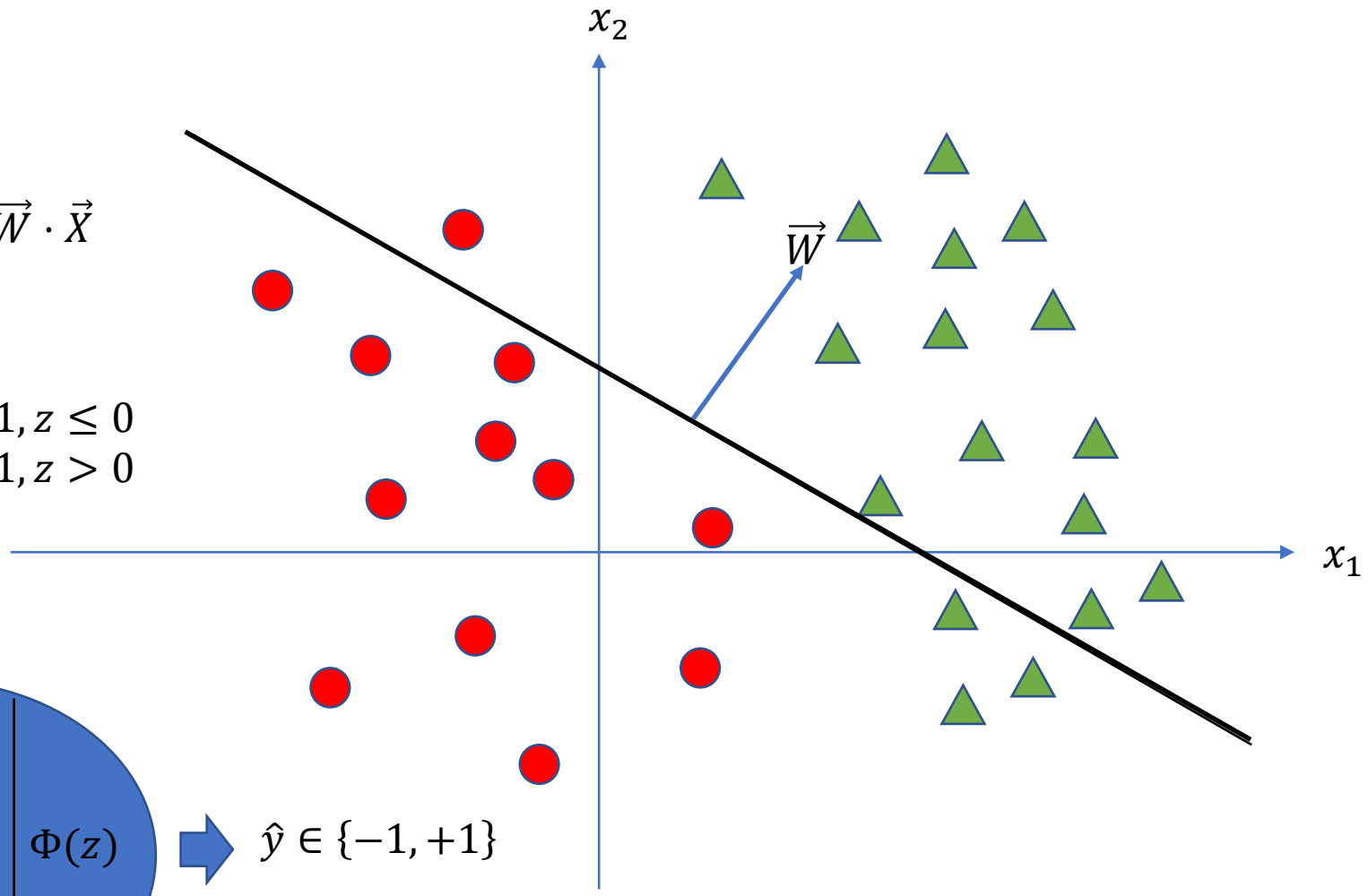

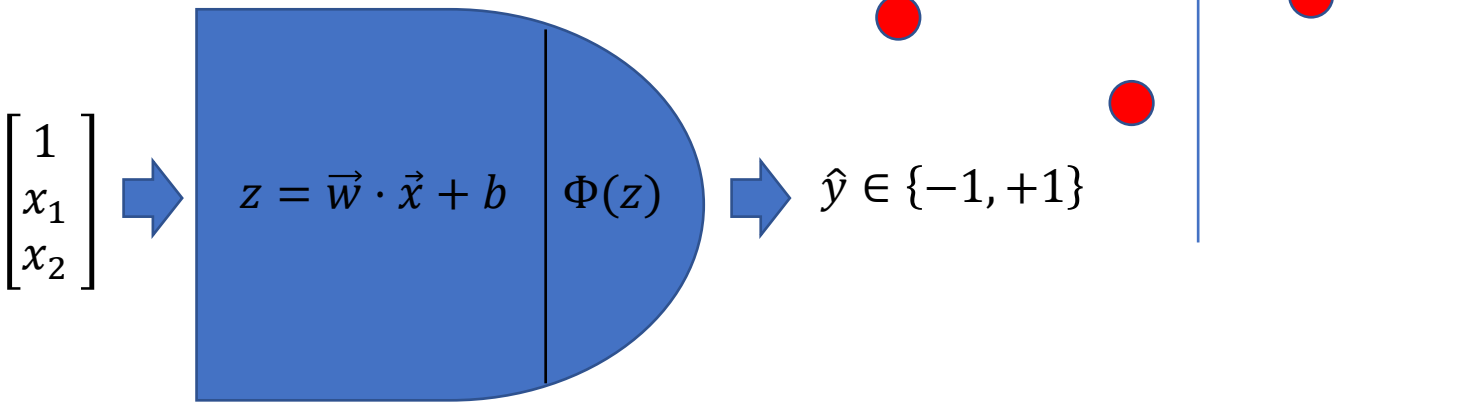

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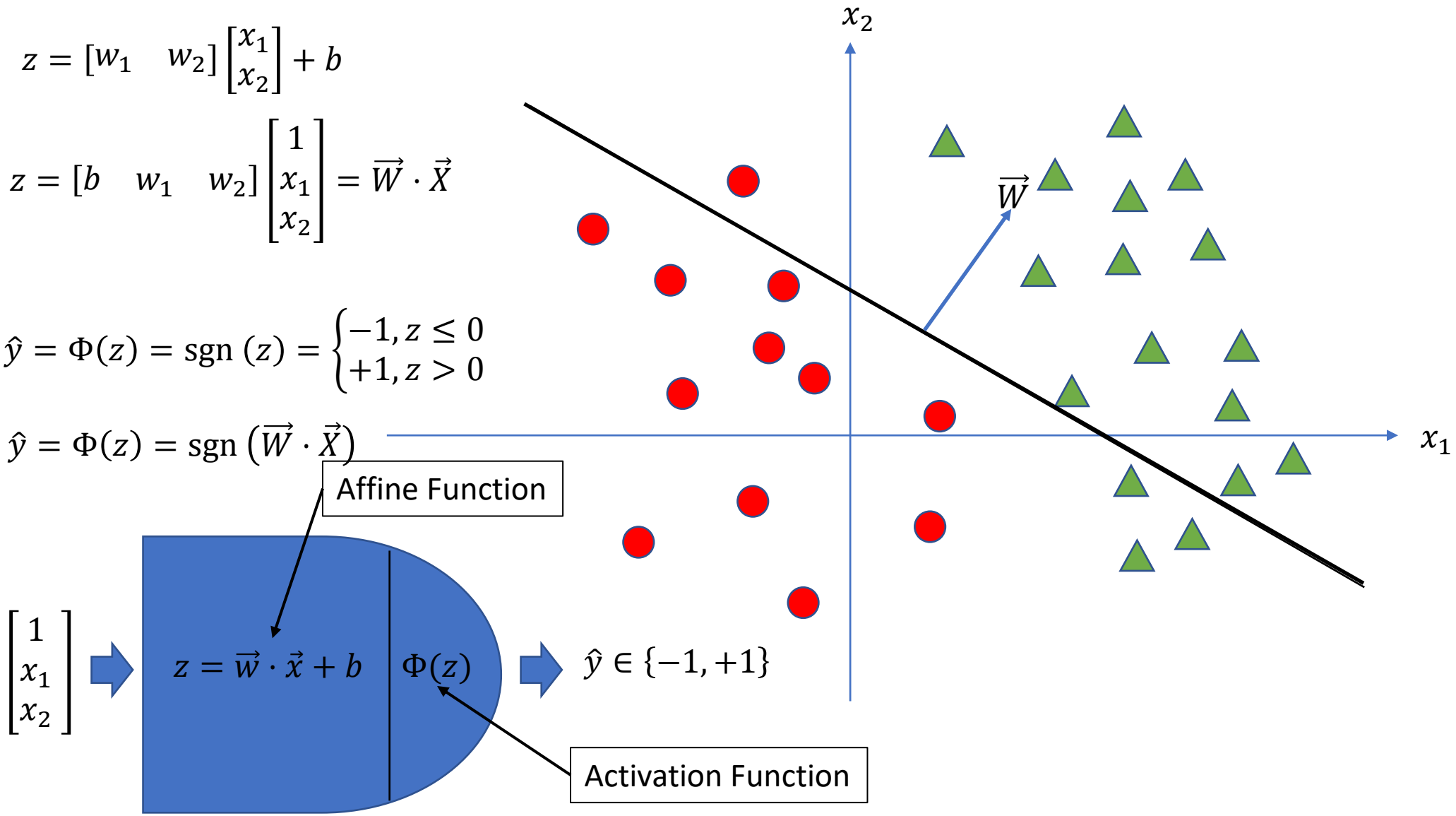
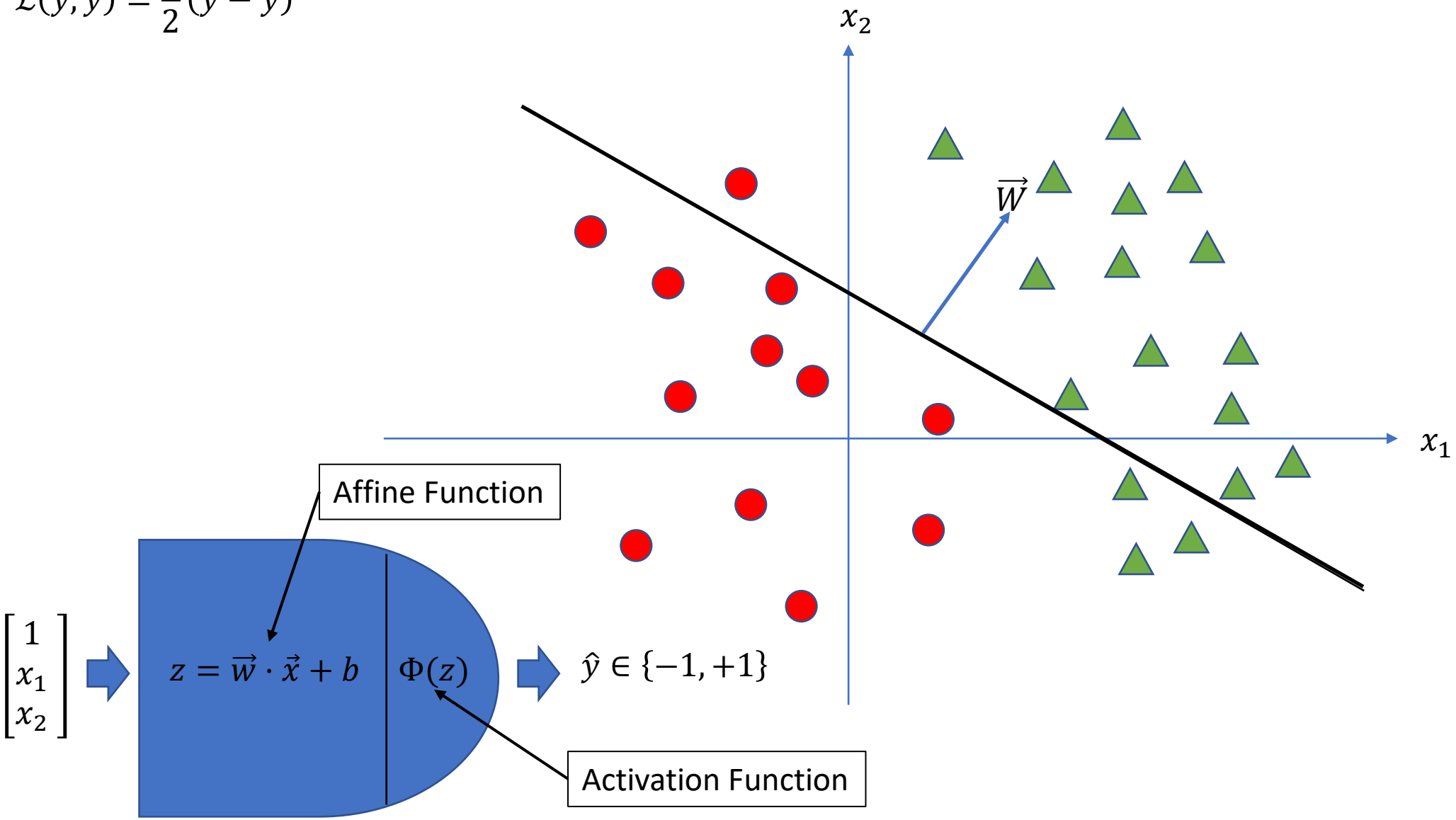


Performance:

$$\mathcal{L}(\hat{y}, y) = \frac{1}{2}(y - \hat{y})$$



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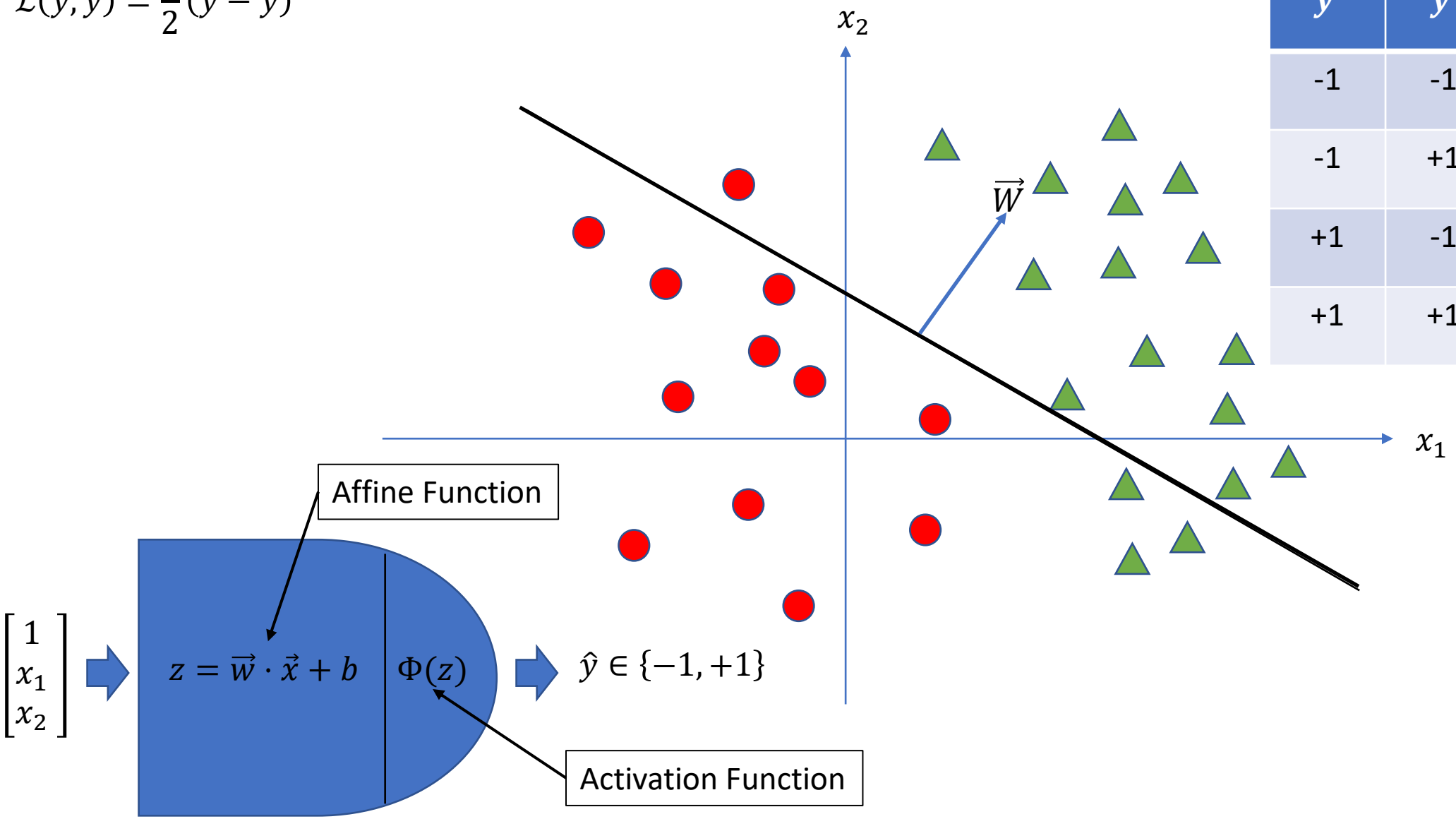
$$\mathcal{L}(\hat{y}, y) = \frac{1}{2}(y - \hat{y})$$

$$\hat{y} = \text{sgn}\left(\vec{W} \cdot \vec{X}\right)$$

y	$\hat{y}$	P	$\mathcal{L}(\hat{y}, y)$
-1	-1	TN	0
-1	+1	FP	-1
+1	-1	FN	+1
+1	+1	TP	0



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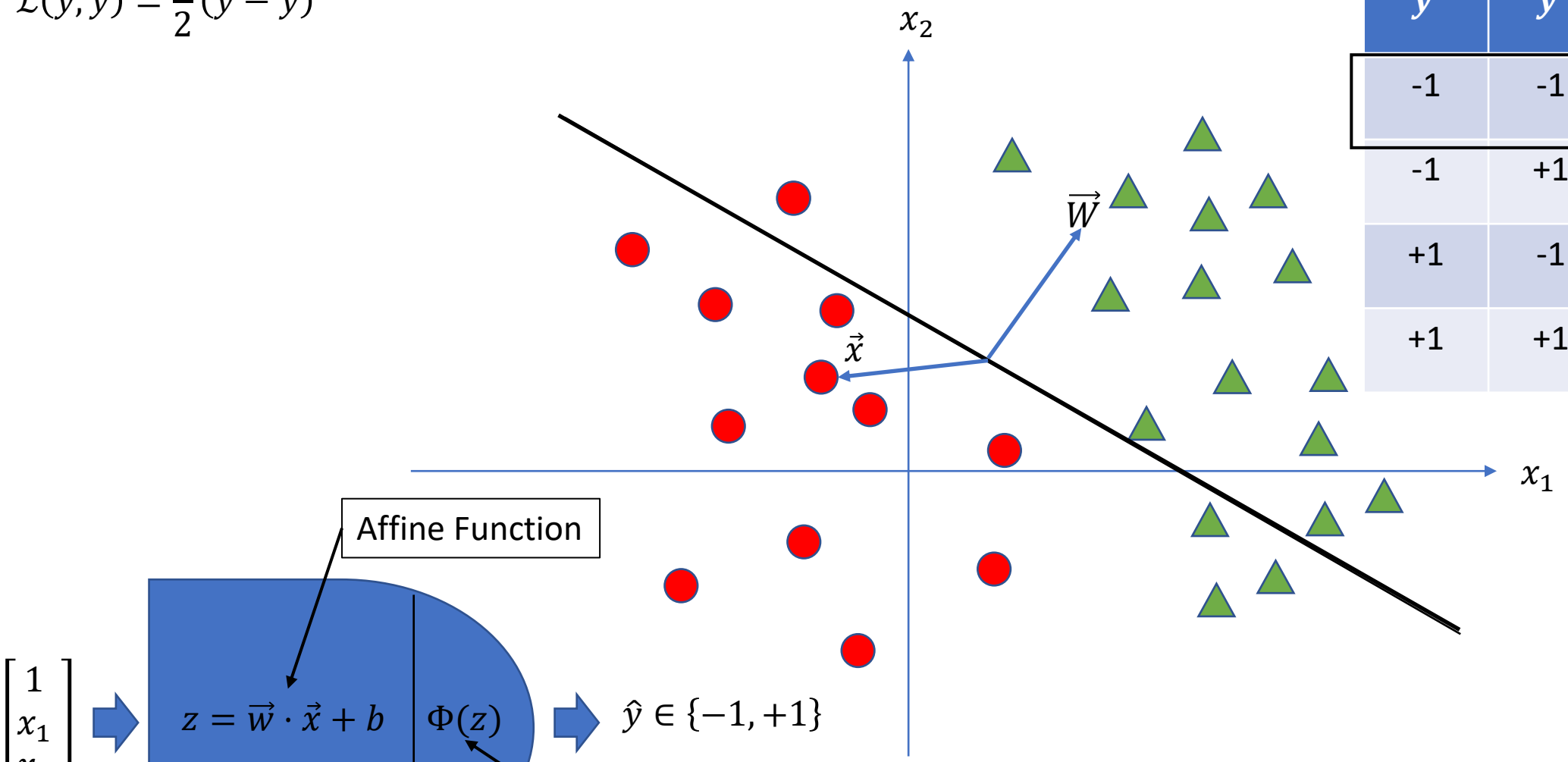

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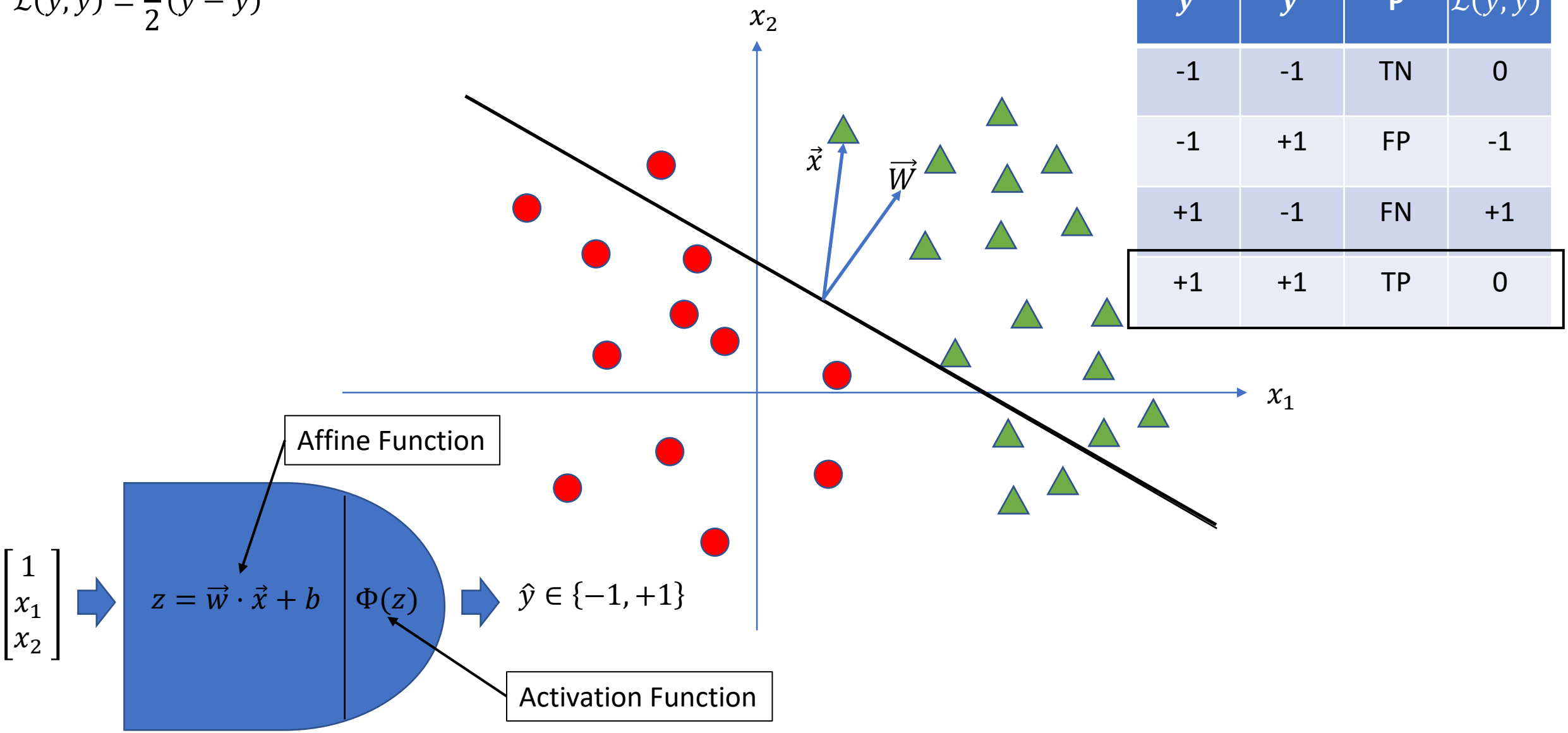

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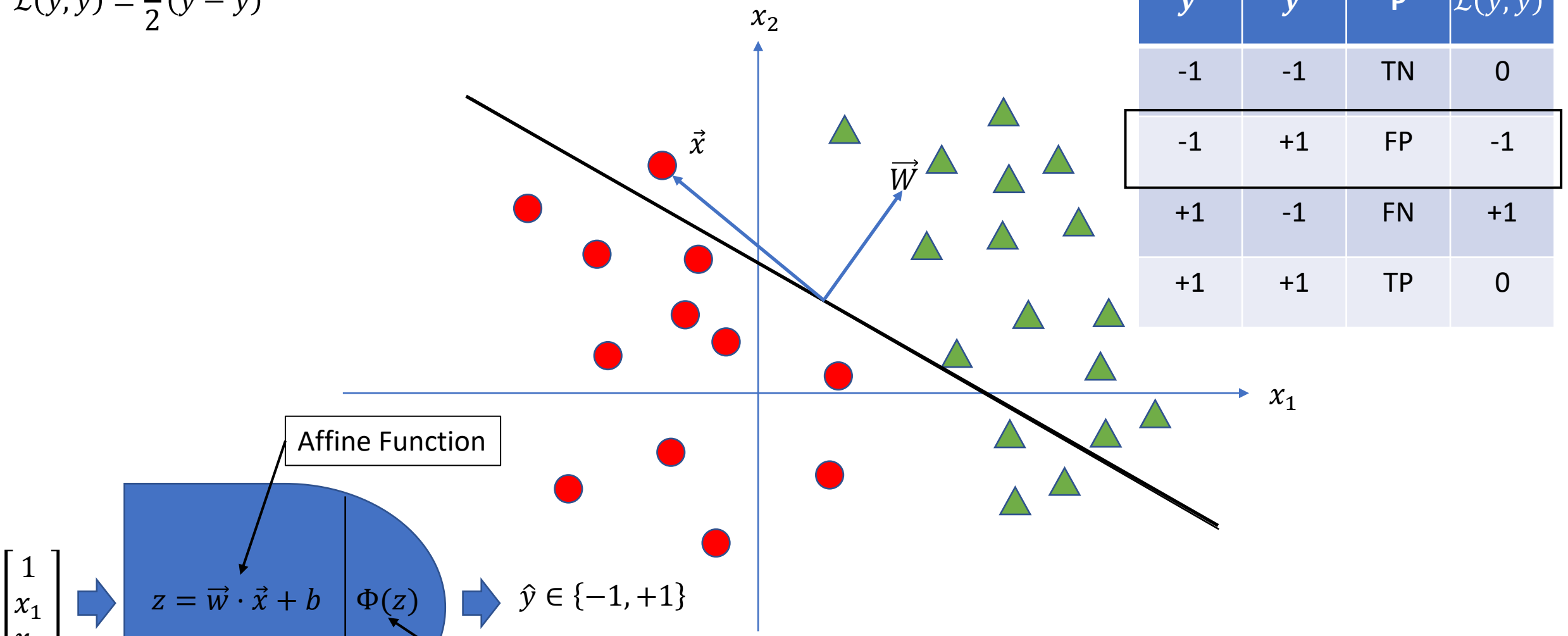

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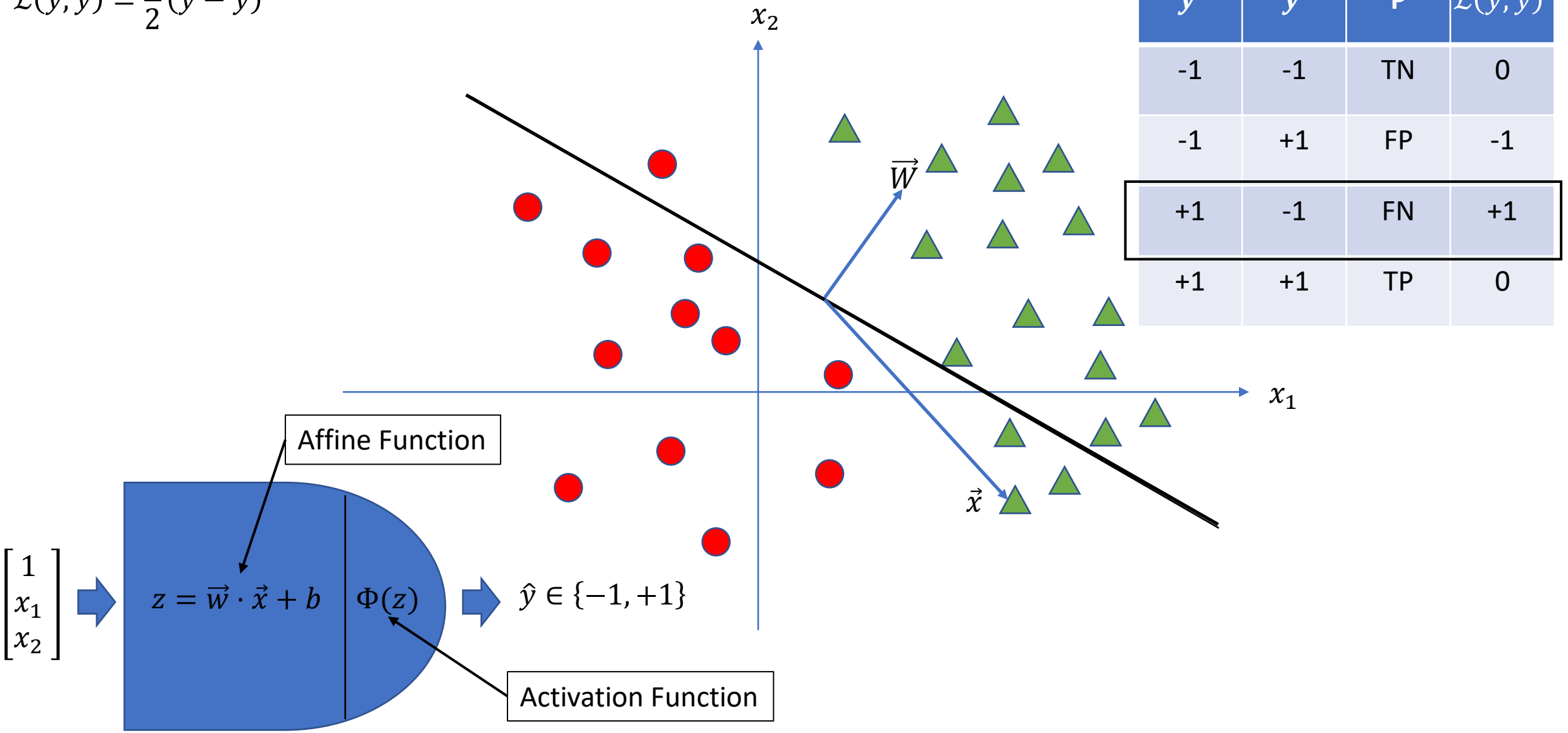

Performance:

$$\mathcal{L}(\hat{y}, y) = \frac{1}{2}(y - \hat{y})$$

UPDATE:

$$\vec{W} \leftarrow \vec{W} + \alpha \mathcal{L}(\hat{y}, y)\, \vec{X}$$

α = Learning Rate

$$\hat{y} = \text{sgn}\left(\vec{W} \cdot \vec{X}\right)$$

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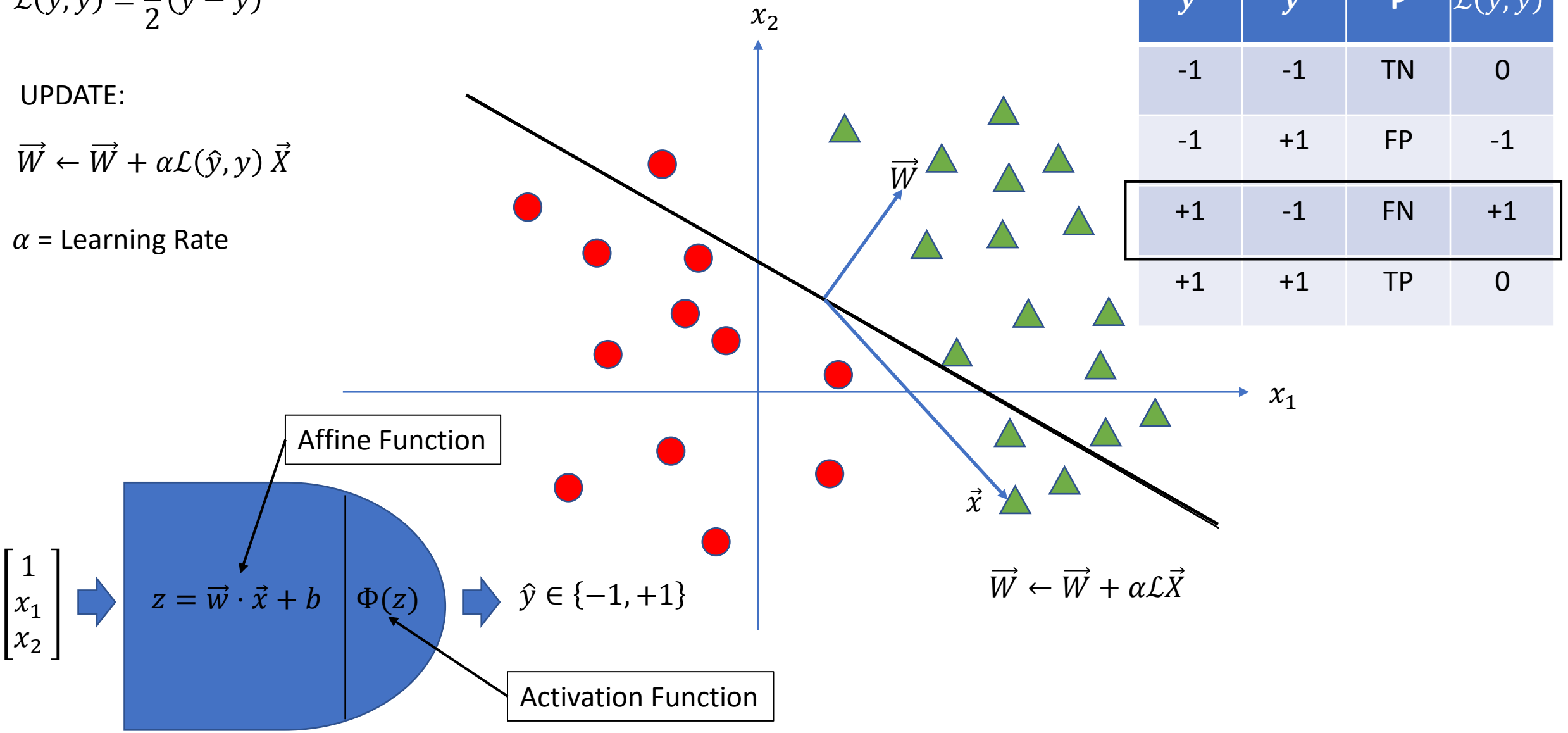

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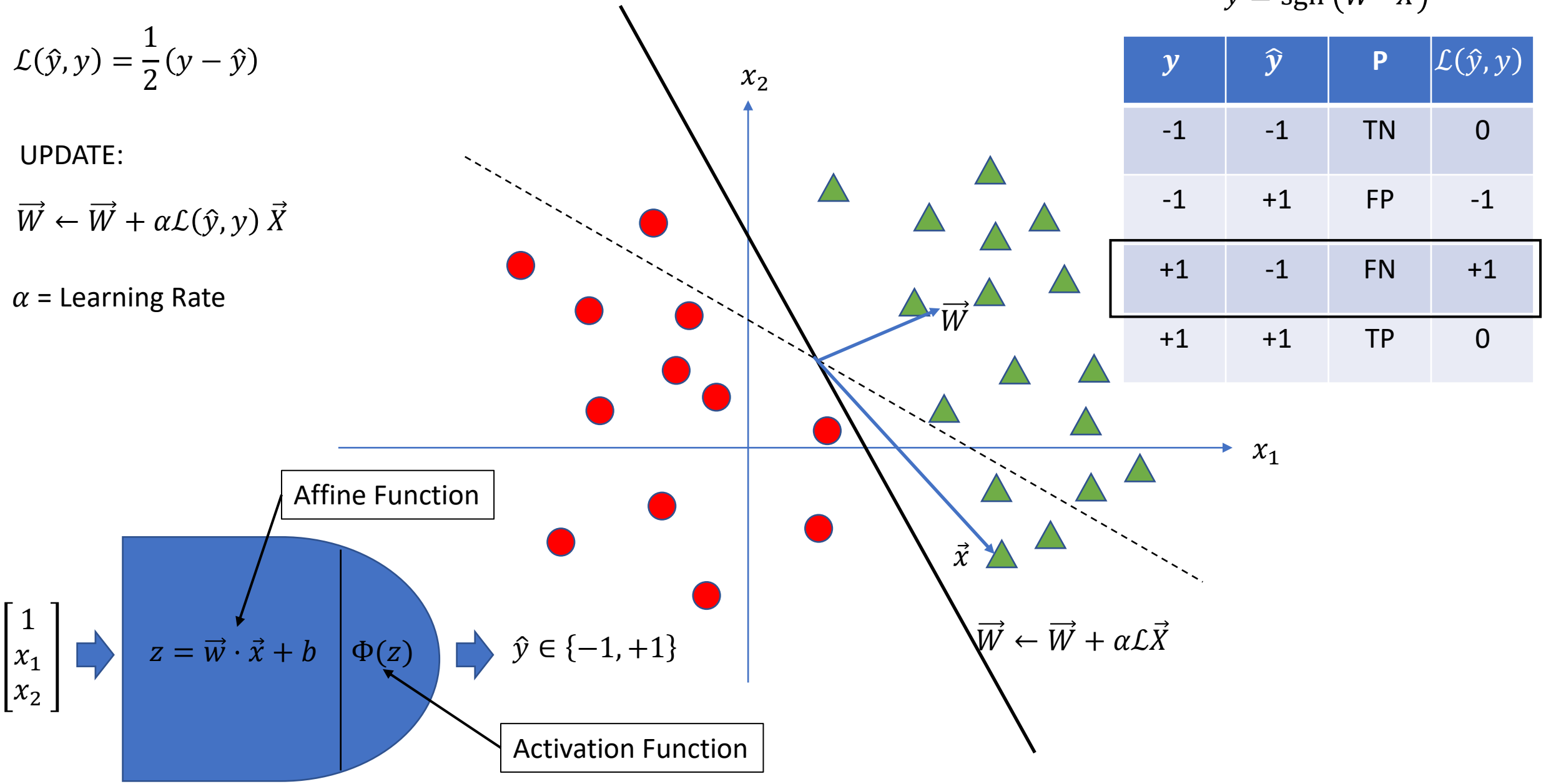

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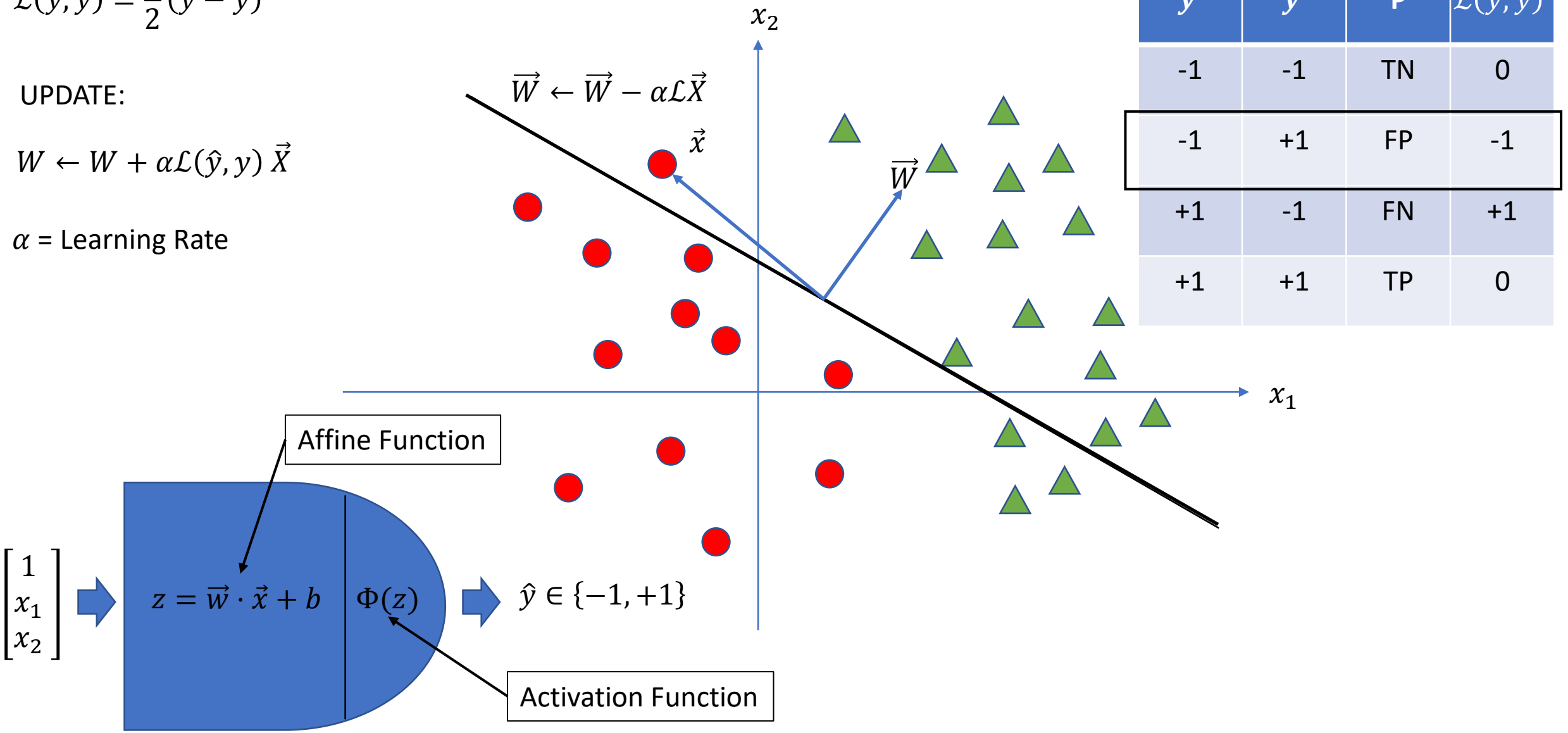

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