Assignment 2

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BE CMPN A.

Q1] $w = [1 \quad -2 \quad -1 \quad 1]$ (vector)

$b = [1, \quad 0]$ (vector)

$x_1 = 1 \qquad x_2 = -1$

Task 1:

$$z = 1 + 1 + 1$$
$$= 4$$

$f(z) \Rightarrow$

① Sigmoid.

$$= \frac{1}{1+e^{-4}}$$

$$= 0.98$$

(smooth probability like output)

② ReLU

$$= \max(0, 4)$$

$$= 4$$

(Directly give z for +ve)

③ tanh

$$= \frac{e^{4} - e^{-4}}{e^{4} + e^{-4}}$$

$$= 0.11$$

(centered around 0, highlights direction)

④ step

$$z > 0$$

$$= 1$$

(Binary classification)

Task 2

a] Sigmoid = Moderately sensitive

Relu = linearly sensitive for $z > 0$
Completely insensitive for $z < 0$

tanh = highly sensitive near 0;
Saturates for large positive/negative z

Step = Non sensitive

b] Step function

c] Sigmoid and Tanh.

Task 3

Sharp Decision ⟹ step function.

Smooth confidence ⟹ sigmoid.