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**Q1. Is the following a proper distance function? Why? Explain your answer. Measure the distance between (0, 0, 0) and (0, 1, 0).**

for proper distance function these three conditions need to be true

1. d (x, y) >= 0, and d (x, y) = 0 if and only if x = y
2. d (x, y) = d (y, x)
3. d (x, z) <= d (x, y) + d (y, z)

but if we try 1st condition

𝒅 (𝒙, 𝒚) = Ʃ ((𝒙𝒊― y𝒊) ^ 𝟑)

= (0 – 0) ^3 + (0 – 1) ^3 + (0 – 0) ^3

= (-1) ^3

= -1 (Which is negative)

So here for this function d (x, y) is -1 which does not satisfy 1st condition so is not a proper distance function.