**#1** (10 Points)

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

ANS: There are two points: A (0,0,0) and B (0,1,0)

To work the distance function, it should satisfy the following conditions:

1. The distance function should be non-negative is that d (x, y)>=0.
2. The distance function should hold triangle inequality or subadditivity is that

d (x, z) <=d (x, y) +d (y, z).

1. The distance function should be symmetry is that d (x, y) =d (y, x).

Using the distance function:

The distance between A and B: - ((0-0) ^5 + (0-1) ^5 + (0-0) ^5) = -1

The distance between B and A: - ((0-0) ^5 + (1-0) ^5 +(0-0) ^5) = 1

So, the distance between A and B is negative which does not satisfy 1st condition and the distance between A to B and B to A are not equal which does not satisfy 3rd condition.