Problem 7:

$$d_2(x,y) = \left(\sum_{i=1}^{d} (x_i - y_i)^2\right)^{\frac{1}{2}}$$

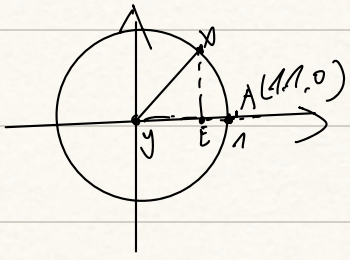
$$d_2^2(x,y) = \sum_{i=1}^{d} (x_i - y_i)^2$$

$$d_1^2(x,y) = \left(\sum_{i=1}^{d} |x_i - y_i|\right)^2 = \sum_{i=1}^{d} |x_i - y_i| \cdot |x_i - y_i| + \sum_{i=1}^{d} \sum_{j \neq i} |x_i - y_i| \, |x_j - y_j|$$

$$\geq \sum_{i=1}^{d} |x_i - y_i|^2 = d_2^2(x,y)$$

$$d_1(x,y) \geq d_2(x,y)$$

Problem 8:



y has 2 neighbors of x and A

$x\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

$A(1,1,0)$

$d_2(x,y) = 1$

$d_2(A,y) = 1.7 > d_2(x,y)$

x is the nearst neighbor of y regarding L_2 norm.

$d_1(x,y) = \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} = \sqrt{2} > d_1(A,y) = 1.1$

But regarding L_1 norm, A is the nearst neighbor of y.