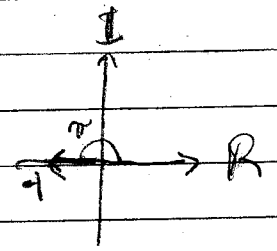
Q7

1.a) $A \in M_n(\mathbb{C})$ is hermitian iff $A = A^*$
"It's equal to it's conjugate transpose"

2. DNE, a least square solution always exists because it doesn't need to be a proper solution.
We always project vectors to have a consistant solution as the projection always lies on the col space of the system

3.
$z = -1$ $\quad r = \sqrt{(-1)^2 + (0)^2} = 1$ $\quad \theta_{ref} = \arctan\left(\frac{0}{-1}\right) = 0$
take $\theta = \pi$



$z = \cos(\pi) + i\sin(\pi)$

$\sqrt[4]{z} = \cos\left(\frac{\pi + 2\pi k}{4}\right) + i\sin\left(\frac{\pi + 2\pi k}{4}\right) \quad k = 0, 1, 2, 3$

$k = 0$

$\cos\left(\frac{\pi}{4}\right) + i\sin\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2} + i\frac{\sqrt{2}}{2}$

$k = 1$

$\cos\left(\frac{3\pi}{4}\right) + i\sin\left(\frac{3\pi}{4}\right) = -\frac{\sqrt{2}}{2} + i\frac{\sqrt{2}}{2}$

$k = 2$

$\cos\left(\frac{5\pi}{4}\right) + i\sin\left(\frac{5\pi}{4}\right) = -\frac{\sqrt{2}}{2} - i\frac{\sqrt{2}}{2}$

$k = 3$

$\cos\left(\frac{7\pi}{4}\right) + i\sin\left(\frac{7\pi}{4}\right) = \frac{\sqrt{2}}{2} - i\frac{\sqrt{2}}{2}$