Normed Linear Spaces Exercises

1) Prove the following: for any x, y in a normed linear space,

$$\|x\| - \|y\| \leq \|x - y\|$$

2) Prove that if $x_n \to x$ is a convergent sequence in a normed linear space, then $\|x_n\| \to \|x\|$

3) Prove that $\sum_{n=0}^{\infty} a\delta^n = \frac{a}{1-\delta}$ for $\delta \in (0, 1)$.