HW 12, Due Friday April 27

1) Rudin page 239 exercise 1

2) Rudin page 239 exercise 5. Note that $x \cdot y$ is the dot product, that is $x \cdot y = x_1 y_1 + \cdots + x_n y_n$.

3) Find A and B in $L(\mathbb{R}^2, \mathbb{R}^2)$ such that $\|AB\| < \|A\| \, \|B\|$. You can give A and B as matrices.

4) Show that if $A \in L(\mathbb{R}^n, \mathbb{R}^m)$, then there exists $x \in \mathbb{R}^n$ such that $\|Ax\| = \|A\|$.

5) Show that $\frac{1}{\|A\|} \leq \|A^{-1}\|$. Find an A where equality does not hold (again 2 by 2 matrices will do).