Due: Friday, October 12th

1. Exercise 4.1.F in the text.
2. Exercise 4.2.B and 4.2.C in the text.
3. Suppose that $\mathbf{x} = (x_1, x_2 \ldots)$ and $\mathbf{y} = (y_1, y_2 \ldots)$ are sequences so that $\sum_{n=1}^{\infty} x_n^2$ and $\sum_{n=1}^{\infty} y_n^2$ converge. Show that
$$\left| \sum_{n=1}^{\infty} x_n y_n \right| \leq \left(\sum_{n=1}^{\infty} x_n^2 \right)^{1/2} \cdot \left(\sum_{n=1}^{\infty} y_n^2 \right)^{1/2}.$$
In particular, you are showing that the series on the lefthand side converges.