

**Numerical Computing**  
**Homework 3**

1. In the Heath text p. 97:

2.3, 2.4, 2.6, 2.7(a,b)

2. Prove using the definitions of the norms that for any vector  $\mathbf{x}$ ,

$$\|\mathbf{x}\|_{\infty} \leq \|\mathbf{x}\|_2 \leq \|\mathbf{x}\|_1$$

3. Prove that for any vector  $\mathbf{x}$  with  $n$  components  $x_1, x_2, \dots, x_n$ ,

$$\|\mathbf{x}\|_1 \leq \sqrt{n} \|\mathbf{x}\|_2$$

and that

$$\|\mathbf{x}\|_1 \leq n \|\mathbf{x}\|_{\infty}$$