

Assignment #5 due October 10, 2002:**Reading:**

Sections 3.4, 3.9–3.10, 3.16, 3.19, 4.14

Problems:

Part I:

3.11: 1, 5, 6

3.20: 6, 8

4:15: 2, 4

Part II:

Suppose that f and g are continuous functions over an interval $[a, b]$. Prove the *Cauchy-Schwartz inequality for integrals*

$$\left(\int_a^b f(x)g(x)dx \right)^2 \leq \left(\int_a^b f(x)^2dx \right) \left(\int_a^b g(x)^2dx \right).$$

Hint: Use the method of proof of the Cauchy-Schwartz Inequality on page 452 of the text (or the method given in lecture) with A and B replaced by f and g and the dot product replaced by an integral.

Extra Credit: Give a necessary and sufficient condition for equality to hold.