ASSIGNMENT 9
Due Thursday, December 2, 2004

Problem 1: Exercise 11, page 142.

Problem 2: Exercise 20, page 142.

Problem 3: Exercise 21, page 142.

Problem 4: Exercise 5, page 145.

Problem 5: Exercise 1, page 155.

Problem 6: Exercise 8, page 155.

Problem 7: Exercise 15, page 167.

Problem 8: Exercise 8, page 173.

Problem 9: Exercise 15, page 174.

Problem 10: Let $f(x)$ and $g(x)$ be defined for all real x. Define $h(x) = \max\{f(x), g(x)\}$ for all reall x. Prove or disprove with a counterexample both of the following statements:

A: If f and g are continuous at zero then h is also continuous at zero.

B: If f and g are differentiable at zero then h is also differentiable at zero.

Problem 11: Define $f(x) = x^2 \sin(1/x)$ is $x \neq 0$ and $f(0) = 0$. Show that f is differentiable at zero.

Problem 12: Let $a < b$ and assume that f is continuous at every point of $[a, b]$. Then for every $x \in [a, b]$, f is integrable on the interval $[a, x]$. Hence we may define

$$A(x) = \int_a^x f(s)ds$$

for $x \in [a, b]$. Show that at each $x \in (a, b)$, F is differentiable at x and that

$$A'(x) = f(x).$$

Problem 13: Find the derivative of $f(x) = \sin(\sqrt{x + \sqrt{3x + 7}})$ for $x > 0$.