

**Math 166: Honors Calculus II**

Name: \_\_\_\_\_

**Quiz 1** *Jan. 27, 2000*

1. Let  $f$  be continuous on  $[a, b]$  and let  $A(x) = \int_a^x f(t) dt$  for  $x \in [a, b]$ . Use the MEAN VALUE THEOREM to prove that  $A'(x) = f(x)$  for  $x \in (a, b)$ . (Recall that the MVT implies that if  $f$  is continuous on an interval  $I$ , then for any  $x, x + h \in I$ , there is a  $z$  between  $x$  and  $x + h$  such that  $f(z) = \frac{1}{h} \int_x^{x+h} f(t) dt$ .)

2. Compute the following.

a)  $\int \frac{x}{\sqrt{x+1}} dx.$

b)  $\int (x \log(x))^2 dx$

c)  $\frac{d}{dx} \int_{3x}^{x^2} \sqrt{\cos(t) + \sin(t)} dt.$