Math 165: Honors Calculus I Name:_____
Quiz 5 *Oct. 8, 1998*

1. Find the average value of $f(x) = 4x - x^2$ on the interval $[0, 4]$.

2. Use the addition formulas for $\cos(x)$ to prove that

$$\sin^2(x) = \frac{1 - \cos(2x)}{2} \quad \text{and} \quad \cos^2(x) = \frac{1 + \cos(2x)}{2}$$

3. Show that if $f(x)$ is integrable and $f(x) \geq 0$ on $[a, b]$, then $F(x) = \int_a^x f(t)\, dt$ is increasing on $[a, b]$

   (Hint: For $a \leq x_1 \leq x_2 \leq b$, show that $F(x_2) - F(x_1) \geq 0$.)