**MAT 254 – Winter Quarter 2002**
**Test 3**

**NAME**_____

**Show work and write clearly.**

1. (30 pts.)

a. Find the average value of $f(x) = -\sin x$ on $[0, \pi]$.

b. Find the value $c$ such that $f(c) = f_{ave}$.

c. Sketch the graph of $f(x)$ and construct a rectangle over the interval whose area is the same as the area under the graph of $f(x)$ over the interval.

2. (48 pts.) Find the following integrals:

a. $\int \frac{y}{\sqrt{y+1}}\,dy$

b. $\int \tan^3(5x)\sec^2(5x)dx$

c. $\int_1^{3/2} \left[\csc^2(\cos(3t))\right]\sin(3t)dt$

d. $\int_{-\sqrt{2}}^{0} x\left(2 - x^2\right)^3 dx$

3. (22 pts.) Sketch the area between $y = x^3$, $y = -x$, $y = 8$. Find the area.