MAT 195 – Fall Quarter 2002
TEST 1

NAME_____

Show work and write clearly.

1. *15 pts.* Let $h(x) = \sqrt{x^3 + 9}$. Find $h^{-1}(x)$. State the domain and range for $h(x)$ and $h^{-1}(x)$.

2. *10 pts.* Let $f(x) = \sqrt{(\tan(-5x))^3}$. Write f as a composition of five functions.

3. *15 pts.* Find the domain and range of:

(a). $f(x) = \dfrac{1}{\sqrt{x - x^3}}$ (b). $g(x) = \sqrt{4 - 3x^2}$

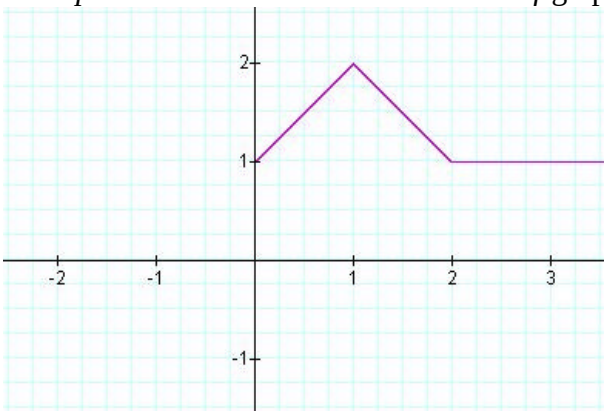
4. *10 pts.* Determine whether f is even, odd or neither even nor odd. **Explain**.

(a). $f(x) = 1 + \sin x$ (b). $f(x) = x^7 - x^3$

5. *15 pts.* A small-appliance manufacturer finds that it costs $9000 to produce 1000 toaster ovens a week and $12,000 to produce 1500 toaster ovens a week.
(a). Express the cost as a function of the number of toaster oven produced, assuming that it is linear. Sketch the graph.
(b). What is the slope and what does it represent?
(c). What is the y-intercept of the graph and what does it represent?

6. *15 pts.* Suppose that $f(x) = \sqrt{x}$ and $g(x) = \sqrt{4 - x^2}$.
(a). What are the domains of $f + g$, $f \bullet g$, f/g, g/f?
(b). What are $f(g(x))$ and $g(f(x))$?

7. *10 pts.* Find a formula for the function f graphed below.



8. *10 pts.* Starting with the graph of $y = x - x\ln|x|$, find the equation of the graph that results from
(a). shifting 3 units upward
(b). shifting 5 units to the left
(c). reflecting about the x-axis
(d). reflecting about the y-axis
(e). shifting 5 units to the right and then reflecting over the y-axis