Math 180 Name _____
Fall, 2008

Homework #1
Due Wednesday, September 3
No late homework accepted! No excuses!

1. A box with an open top is to be constructed from a rectangular piece of cardboard with dimensions 8 inches by 11 inches by cutting out equal squares of side x at each corner and then folding up the sides. Express the volume V of the box as a function of x. Find the domain.

2. Determine analytically whether $f(x)=\frac{x}{x^2-1}$ is an even function, an odd function or neither.

3. Let $h(x) = (f \circ g)(x)$ where f is an even function. Is h always an even function? Give reasons for your answer.

4. Evaluate the expression $\sin\left(\arctan\dfrac{x}{\sqrt{x^2+1}}\right)$.

5. Let $f(x) = \cos x$. Evaluate and simplify $\dfrac{f(x+h)-f(x)}{h}$.

6. Simplify each of the following expressions.

a) $$\frac{\left(x^2-4\right)^{\frac{1}{2}}\cdot 3-3x\cdot\frac{1}{2}\left(x^2-4\right)^{-\frac{1}{2}}\cdot 2x}{\left[\left(x^2-4\right)^{\frac{1}{2}}\right]^2}$$

b) $$\frac{(x-3)^{\frac{1}{3}}\cdot 2x-\left(x^2-3\right)\cdot\frac{1}{3}\cdot(x-3)^{-\frac{2}{3}}\cdot 1}{\left[(x-3)^{\frac{1}{3}}\right]^2}$$

4. Solve each equation.

a) $\sin x + \cos x = 1 \quad [0, 2\pi)$

b) $\log x^2 + (\log x)^2 = 0$

c) $\log x + \log(x - 3) = 1$