Advanced Calculus II – Spring 2007
Additional Problems for March 23

1. Suppose that H is twice differentiable on $\mathbb{R}$ and $H''(x) = -H(x)$, show that there exists $a, b \in \mathbb{R}$ such that $H(x) = aC(x) + bS(x)$ for all $x \in \mathbb{R}$.

   (Hint: Figure out what a and b are in terms of H and H' and come up with function F and G that satisfy $F' = G$, $G' = -F$, $F(0) = 0$ and $G(0) = 1$ and use the theorem that says that $F = S$ and $G = C$.)

2. Show S is odd and C is even. (Hint: Use previous problem.)