Challenge Problem for September 28, 2008

1. In class we defined $S_{2n} = \dfrac{T_n + 2M_n}{3}$. Show that

$$S_{2n} = \frac{\Delta x}{3}\left(f(x_0) + 4f(x_1) + 2f(x_2) + 4f(x_3) + \cdots + 2f(x_{2n-2}) + 4f(x_{2n-1}) + f(2x_n)\right).$$

Hint: Remember the number of subintervals in T_n, M_n and S_{2n} are different hence Δx is different.