MA/CSC 427 HOMEWORK 2 Due 10/17/03

Let $p(x)$ denote the quadratic polynomial that interpolates a given function $f(x)$ at the three points $x = a, \frac{a+b}{2}, b$.

1. Use the Newton formula to write down the expression of the polynomial $p(x)$.

2. Show, by hand calculation, that

$$\int_a^b p(x)dx = \frac{b-a}{6}\left(f(a) + 4f(\frac{a+b}{2}) + f(b)\right).$$

This is known as the Simpson's rule. *(Hint: Recenter the graph at the midpoint and the area will not be changed.)*