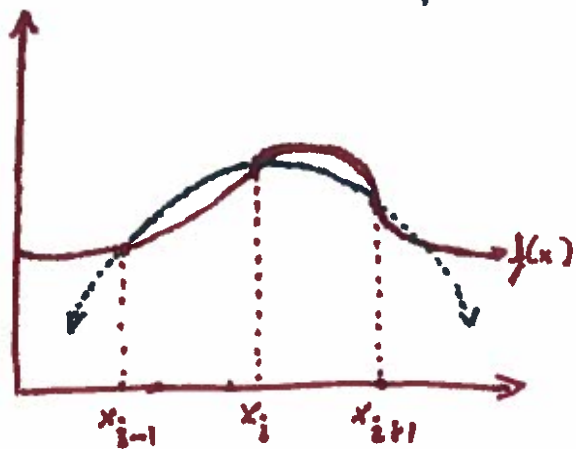# Optional Homework: Simpson's Rule

Let $\Delta x = x_i - x_{i-1} = x_{i+1} - x_i$.

Show that the area under the parabola passing through the points

$$(x_{i-1}, f(x_{i-1}))$$
$$(x_i, f(x_i))$$
$$(x_{i+1}, f(x_{i+1}))$$

is equal to

$$\frac{\Delta x}{3}\left(f(x_{i-1}) + 4f(x_i) + f(x_{i+1}) \right).$$

Due by
Wednesday May 28TH, 2014

Hints:

- don't assume that $(x_i, f(x_i))$ is the vertex of the parabola, this isn't necessarily true, it just looks that way in my drawing.

- try writing the equation for the parabola as $p(x) = ax^2 + bx + c$. Then compute $p(x_{i-1})$, $p(x_i)$, $p(x_{i+1})$ and use this info to solve for a, b, and c.

- if you get stuck, follow along with this youtube video and try to mimic her technique: http://www.youtube.com/watch?v=uc4xJsi99bk (but try it yourself first!)