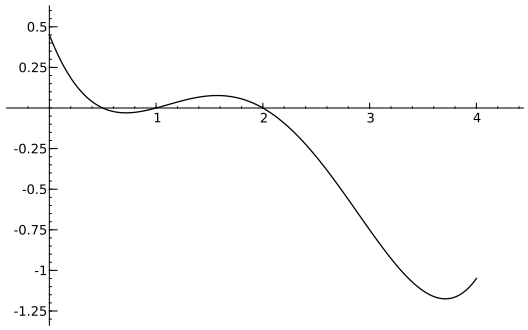
WORKSHEET FOR 2/2/2009

Reading assignment for Wednesday. Read section 7.2.
Homework due Wednesday. 7.1: 3, 8, 12, 47 (Hint: Use the following identity to simplify: $a^2+2ab+b^2 = (a+b)^2$)
Let $I = \int_a^b f(x)dx$. Theorem 6.3 tells us that if $|f'(x)| \leq K_1$, and $|f''(x)| \leq K_2$ on $[a,b]$, then the following hold:

- $|I - L_n| \leq K_1(b-a)^2/(2n)$
- $|I - R_n| \leq K_1(b-a)^2/(2n)$
- $|I - T_n| \leq K_2(b-a)^3/(12n^2)$
- $|I - M_n| \leq K_2(b-a)^3/(24n^2)$

The length of a curve $y = f(x)$ on the interval $[a,b]$ is given by $\int_a^b \sqrt{1+(f'(x))^2}dx$.



(1) If the above graph is a graph of $y = f'(x)$, find a value of n so that $|\int_0^4 f(x)dx - R_n| \leq 0.001$.
(2) Draw a graph of the region bounded by the parabola $x = y^2 - 4$ and the y-axis. Find its (unsigned) area.
(3) Find the length of the curve $y = \frac{2}{3}(x-1)^{3/2}$ on the interval $[2,4]$.
(4) (a) Write down an expression for the length of the curve $y = \sqrt{1-x^2}$ on the interval $[-1,1]$. Have me check your answer.
    (b) Evaluate this integral using two methods: (i) geometrically (this is asking for the circumference of half a circle of radius 1) and (ii) using the fundamental theorem of calculus. Make sure your answers agree.
(5) If the above graph is a graph of $y = f''(x)$, find a value of n so that $|T_n - \int_0^4 f(x)dx| \leq 0.001$.