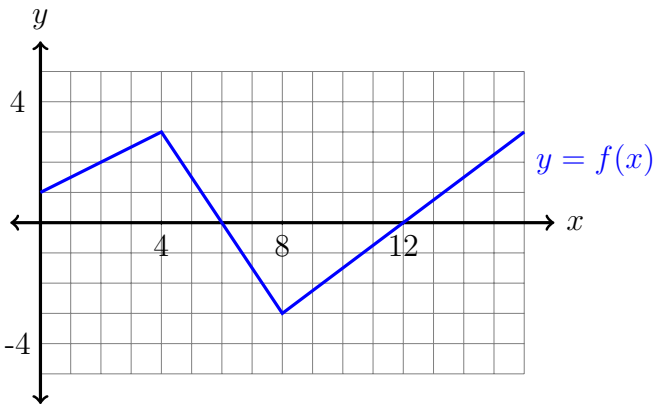
Assignment 11

To be done on a **separate** piece of paper! Please **do not** cram all of your answers onto this worksheet!
Due **Thursday 12/4/14** in class.

1. Use the graph of $f(x)$ below to plot an accurate graph of the antiderivative $F(x)$, with $F(0) = 1$. Label the coordinates (x and y) of the critical points and inflection points.



2. Find the indefinite integrals. Check your work with differentiation.

   (a) $\displaystyle\int \left(\frac{8}{3\sqrt[3]{x^4}}\right)^2 dx$

   (b) $\displaystyle\int \left(\frac{1}{2t} + 2t\right) dt$

   (c) $\displaystyle\int w\left(w^2+1\right)^2 dw$

   (d) $\displaystyle\int \omega\left(\sin(\omega\theta) + \omega\right) d\theta$

3. Evaluate the definite integral $\displaystyle\int_0^{\pi/4} \sec^2(s) ds$.

4. Find the solution of the initial value problem $\dfrac{d^2h}{dt^2} = a$, $h'(0) = v_0$, $h(0) = h_0$.

5. Evaluate the following

   (a) $\displaystyle\int \frac{d}{dx}\left(\frac{2x}{\sqrt{1+x^2}}\right) dx$

   (b) $\dfrac{d}{dx}\displaystyle\int_0^{x^2} (s^2+1)^2(2s-3)^3 ds$

6. Let $R(x) = \displaystyle\int_0^x \sqrt{1+t^2} dt$.

   (a) Evaluate $R(0)$ and determine if R is an even or odd function

   (b) Is R increasing or decreasing?

   (c) What can you say about the concavity of R?

   (d) Sketch a graph of $R(x)$

   (e) Evaluate $\displaystyle\lim_{x\to\infty} \frac{R(x)}{x^2}$