These are only a *few* sample problems to *help* you prepare for the exam. You should also be certain that you completely understand the WebWork assignments, Problems Sets, in-class work, and your class notes.

1. If $F(x) = \displaystyle\int_0^x \frac{t}{\sqrt{1-t^2}}\,dt$, find the equation of the tangent line to $y = F(x)$ at $x = \dfrac{1}{2}$.

2. The graph of $y = f(t)$ is shown below. Let $a = 1$ and $F(x) = \displaystyle\int_a^x f(t)\,dt$.

   (a) Use a left sum with four subdivisions to approximate $F(9)$.

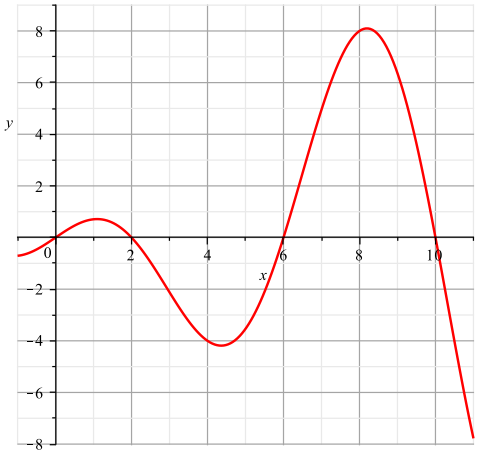
   (b) Where is F increasing? decreasing?

   (c) Identify all local maxima and minima of F.

   (d) Where is F concave up? concave down?

   (e) Use this information to sketch a graph of $y = F(x)$.

   (f) How would your graph change if $a = 3$?



Graph of y= f (t)

3. Find the area of the region bounded by the graphs $y = \tan(x+2) + 5$ and $y = -x + 2$ from $x = 0$ to $x = 2$.

4. A ball is thrown straight up with an initial velocity of 100 ft/sec from the edge of a roof that is 58 feet above ground level.

   (a) How high will the ball go?

   (b) How long is the ball in the air before it hits the ground?

5. Approximate the integral $\displaystyle\int_0^1 \cos(x^3)\,dx$ using a Taylor polynomial.

6. Be sure to review the examples of integration by substitution from the WebWork assignments, Problem Sets, and in class work.

7. The material on differential equations that we discuss in class on Wednesday (4/25) and Friday (4/27) will be covered on the Final Exam.