Some Sample Problems for Exam 3

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, Reading Assignments, in-class work, and your notes.

- 1. If $F(x) = \int_0^x 2t \cos(t^2) dt$, find the equation of the tangent line to y = F(x) at x = 1.
- 2. The graph of y = f(t) is shown below. Let a = 1 and $F(x) = \int_{a}^{x} f(t) dt$.
 - (a) Use a left sum with four subdivisions to approximate F(9).
 - (b) Is F(2) positive or negative?Is F(6) positive or negativeIs F(0) positive or negative?
 - (c) Where is *F* increasing? decreasing?
 - (d) Identify all local maxima and minima of F.
 - (e) Where is *F* concave up? concave down?
 - (f) Which of your answers would change if a = 5? Why?



3. Find the area of the region bounded by the graphs $y = x^3 - x^2 + 1$ and $y = x^2 + 1$



- 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 $\int_0^1 \cos(x^3) dx$ using a Taylor polynomial. Hint: Remember that can use the Taylor polynomial for $\cos(x)$ to find the Taylor polynomial for $\cos(x^3)$
- 6. Find the average value of $g(x) = x^3 e^x + 3x^2 e^x$ over the interval [-1, 2].
- 7. What is the difference between a definite integral and an indefinite integral?

- 160 50 140 40 120 30 100 80 20 60 10 40 20 6 -10 -20 -40 R -20 Plot of y = f''(x)Plot of $y = f^{(4)}(x)$
- 8. The graphs of f'' and $f^{(4)}$ are shown below.

