Here are some problems to try so that you know that you are up to speed for the third quiz.

1. Let the function f be defined by

$$f(x) = (x-1)^2 e^{-x}.$$

   Find all the critical points of f, and decide whether or not they are local maxima or local minima. Also find the regions where f is increasing and decreasing, the inflection points of f and the regions where f is concave up or concave down. Sketch the graph of f consistent with all of this information

2. Repeat the previous question for $g(x) = (x+1)^2/(x^2+1)$.

3. Find the volume of the largest right circular cone that can be inscribed in a sphere of radius three.

4. Show that a one liter can shaped like a right circular cylinder uses the least amount of material when the height h of the can and the radius r satisfy $h = 2r$.

5. You are designing a rectangular poster to contain 50 cm^2 of printing with a 4 cm margin at the top and bottom and a 2 cm margin at the sides. What overall dimensions will minimize the amount of paper used?