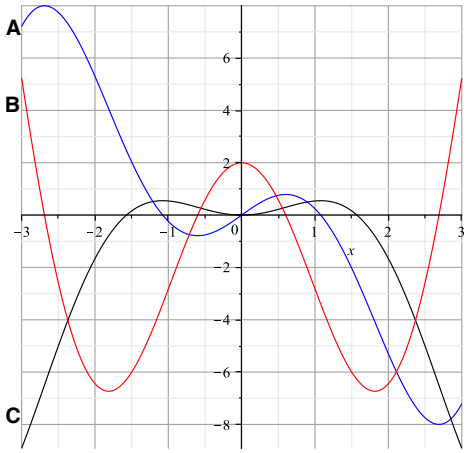
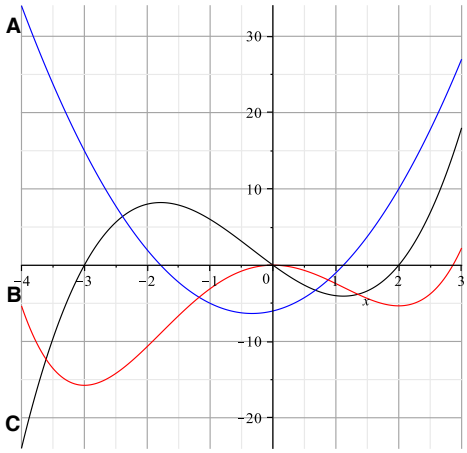
These are only a *few* sample problems to *help* you prepare for the exam. You should also be certain that you completely understand the WebWork assignments, Problems Sets, in-class work, and your class notes.

1. The graphs of f, f', and f'' are shown below on the same set of axes. Label each on the graph.





2. Suppose that the graph labeled C on the left graph in #1 is the graph of $g'(x)$.
   (a) Is g concave up or concave down at $x = -2$?
   (b) Find all critical points of g and label them as local maxima, local minima, or neither.
   (c) If $g(-1) = 3$, could $g(1) = 2$?

3. Use a linear approximation to approximate $\ln(1.05)$.

4. Let $f(x) = e^x$.
   (a) Find the linear approximation of $f(x)$ at $x_0 = 0$ and use this to approximate e.
   (b) Find the third degree Taylor polynomial of $f(x)$ at $x_0 = 0$ and use this to approximate e.
   (c) Which approximation do you think will be more accurate? Why?

5. Find all critical points of $f(x) = 3\,x^5 - 25\,x^3 + 7$ and classify them as local maxima, local minima, or neither.

6. Be sure to complete the WebWork assignment due April 2. There are some good optimization problems there.

7. You will, of course, also want to fluent in finding the derivatives.