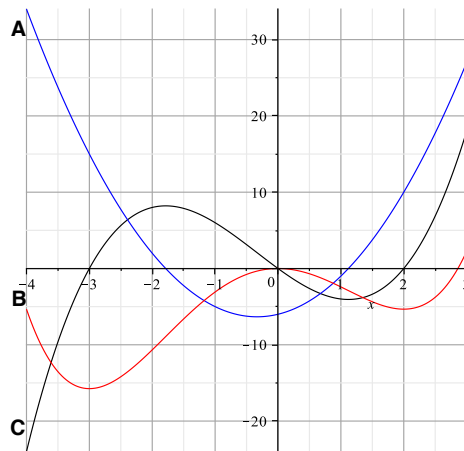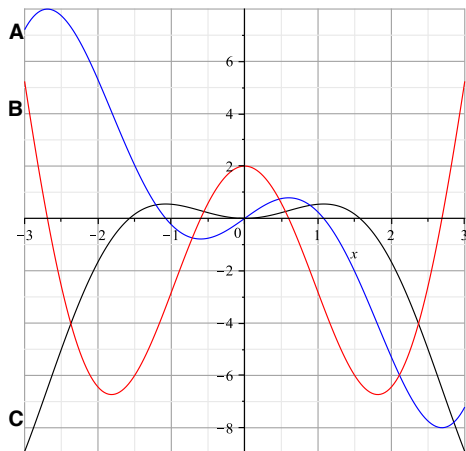These are only a *few* sample problems to *help* you prepare for the exam. You should also be certain that you completely understand the WeBWorK assignments, Problems Sets, Reading Assignments, in-class work, and your class notes.

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. Suppose that the graph labeled C on the right graph in #1 is the graph of $h''(x)$.

   (a) If $x = -2$ is a critical point of h, what does the Second Derivative Test tell you about this point?

   (b) If $x = 0$ is a critical point of h, what does the Second Derivative Test tell you about this point?

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

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. A wire 2 meters long is cut into two pieces that will be used as frames for stained glass decorations. One piece is bent into a square and the other piece is bent into a circle.

   (a) To reduce storage, where should the wire be cut to minimize the total area of both figures? What will the dimensions of the decorations be?

   (b) Where should the wire be cut to maximize the total area? What will the dimensions be in this case?

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