This assignment is due <u>by 8 am</u> on March 9, 2007 You can turn it in to me in class or drop it by the office, **Blocker 640D**. Be sure that you <u>follow the homework rules</u>, they can be found on your syllabus. Please work the problems in the order that they are listed.

1. Find the derivatives of these functions. You do not have to simplify.

    (a) $y = (x^3 + 1)e^{5x^2}$

    (b) $y = \ln(7x + 1)\sqrt{x^3 + 7}$
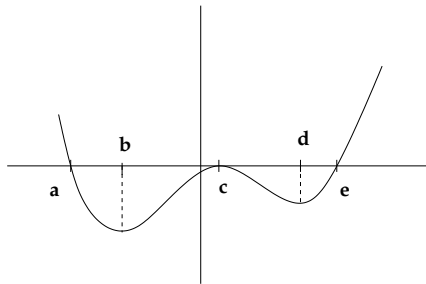
    (c) $y = (x^4 + 5)^6 \cos(3x^2)$

2. Find the derivatives of these functions. You do not have to simplify.

    (a) $y = \dfrac{x^5 + 2x}{x^8 + 7x}$

    (b) $y = \dfrac{e^{3x^2}}{\sin(5x)}$

    (c) $y = \ln\left(\dfrac{\sin(x^5)}{(7x^3 - 8)^3}\right)$

3. Use the graph to answer these questions.

    (a) Assume that the <u>graph is of $f(x)$</u>. Give the critical values for $f(x)$ and classify them as local maximum, local minimum, or neither.

    (b) Assume that the <u>graph is of $f'(x)$</u>. Give the critical values for $f(x)$ and classify them as local maximum, local minimum, or neither.

4. Find and classify the critical values of $f(x) = x^3(1 - x)^4$ as local maximum, local minimum, or neither.

5. For each of these problems, find the intervals where the function $f(x)$ is concave up and concave down. Tell at what values of x the function has an inflection point.

    (a) $f(x) = x^2 + \dfrac{5}{x}$

    (b) Here is the second derivative and the domain of the function:
    Domain of $f(x)$ is all real numbers
    $f''(x) = (x^2 - 36)(x + 2)^2(1 - x)$

6. For what values of a and b does $f(x) = ax - b\ln(x)$ have a local minimum at the point $(2, 5)$