Name:_____

MA 2310 - Mastery Quiz 4: Some of Chapter 4

Show all work and answers on a separate sheet of paper.

1. Find the 1st derivative and 2nd derivative number lines. List the intervals where $f(x)$ is increasing, decreasing, concave up and concave down.
   (a) $f(x) = x^3 - 12x + 1$
   (b) $f(x) = x^{5/3} - x^{2/3}$
2. Graph the following. Find and classify the extrema; label on graph. Find the 1st derivative and 2nd derivative number lines. Identify each critical point on the graph and the points of inflection.
   (a) $f(x) = (x+1)^2(2x-5)^3$
   (b) $f(x) = e^{x^3-3}$
3. A farmer wishes to build a rectangular fenced in pen with 2500 square feet of area. She wishes to minimize the amount of fencing used to build the pen. What are the dimensions to minimize the amount of fencing used?
4. The farmer now is going to build a fenced in pen along the the side of the barn. So the farmer only needs to build only three sides of the pen (the barn will serve as the fourth side of the pen. Again she has 200 linear feet of fencing and she wishes to maximize the area. What are the dimensions of maximum area?
5. Find the linear approximation of $f(x) = 3x^2 \ln(x) - x$ at $a = 1$. That is find $L(x)$. Now use to compute $L(0.97)$.