166 chapter 4 review and practice exam. Practice for Friday's problems:

1. For the equation: $y = x + 2\sin(x)$ on the interval $[0, 2\pi]$
- You do **not** need to find roots (or asymptotes) for this problem
- Find the critical numbers (where the first derivative might change signs)
- Find the values where the second derivative might change signs
- Make a table showing where the first and second derivative are positive and negative
- Sketch the general shape of the graph
- Find y-coordinates and label the local minima, local maxima and points of inflection
- Sketch the graph of the function that includes/reflects the information you found above.
- Find and tell the absolute maximum and absolute minimum on the interval

2. For the equation: $f(x) = .25x^4 - 5x^2 + 3$ on the interval [-4,5]
- You do **not** need to find roots (or asymptotes) for this problem.
- Find the critical numbers (where the first derivative might change signs)
- Find the values where the second derivative might change signs
- Make a table showing where the first and second derivative are positive and negative
- Sketch the general shape of the graph
- Find y-coordinates and label the local minima, local maxima and points of inflection
- Sketch the graph of the function that includes/reflects the information you found above.

3. I want to make a box with a square base and an open top that is subdivided into 4 sections inside as shown. I need the volume of my box to be 2 ft³. The cardboard for the sides and base of the box costs $.50 per ft², and the cardboard for the insert sections costs $.20 per ft². What dimensions give me the cheapest box?
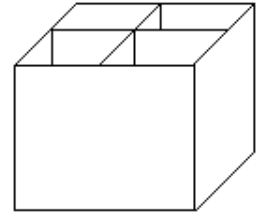
There will be only one box/field problem, but here are two more to practice:
4. I want to make a box with a base whose length is 1.5 times its width, and with a lid whose volume is 3 ft². The material for the base and sides costs $.40 per ft², and the cardboard for the lid costs $.70 per ft². What dimensions give me the cheapest box?

5. Kelly has a kennel where she raises poodles. She wants to fence in an area for the dogs to play, and she has 3 groups of dogs that she needs to keep separated. She plans to do this by fencing a rectangular area, and then subdividing it with two fences parallel to one of the sides. What is the maximum total area she can fence this way, if she has 300 ft of fencing?