Math 166 review for test 3:

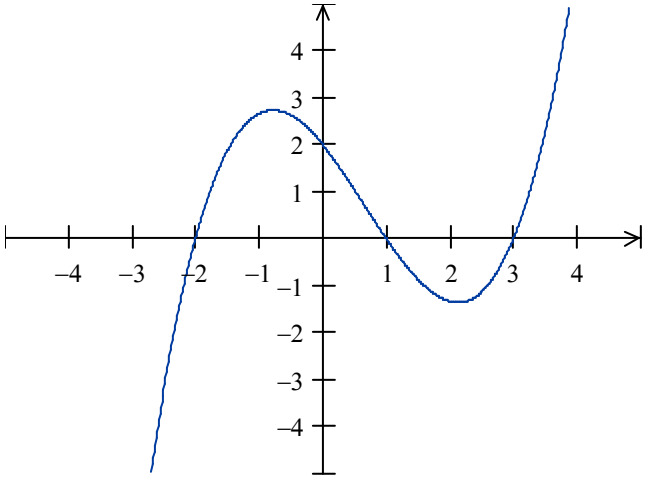
1. Do everything (max, min, increasing, decreasing, inflection points, concavity, and horizontal asymptotes for:
$y = \sin^2 x + 2\sin x$ in the interval $[0, 3\pi]$

2. Find these infinite limits:

$$\lim_{x\to-\infty} \frac{2x+5}{\sqrt{4+9x^2}} \qquad \lim_{x\to\infty} \sqrt{4x^2+5x} - 2x$$

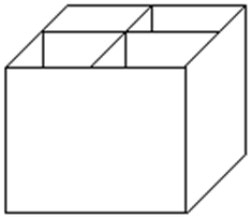
3. Find the absolute max and mins for:
a. Find the absolute maxima and minima for: $y = x + 2\sin(x)$ $[-\pi, 2\pi]$
b. Find the absolute maxima and minima for: $y = x^{7/5} - 3x^{2/5}$ $[-1, 2]$

4. Tell the x-coordinates of the local maxima and local minima of $f(x)$, given this graph of $f'(x)$



There will be at least one max/min problem in an applied context; probably a box problem, and fairly probably a weight or a cost problem.

5. I want to make a box with a square base and an open top that has the greatest possible volume, with a surface area of 9ft^2. What should the dimensions of my box be?



6. 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 ft^3. What should the dimensions of my box be so that I use the least material in constructing it? (assume that the subdivisions are made of the same material as the sides and base of the box)

7. I want to make a box with a square base and an open top that is subdivided into 4 sections inside as shown in #6. I need the volume of my box to be 2 ft^3. The sides and base of the box weigh 6oz/ft^2, and the material I use to construct the inner subdivisions weighs 3oz/ft^2. What should the dimensions of my box be so that it weighs the least?

8. 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 ft^2. The material for the base and sides costs \$.40 per ft^2, and the cardboard for the lid costs \$.70 per ft^2. What dimensions give me the cheapest box?

b. I want to make a box with a square base and an open top that is subdivided into 4 sections inside as shown in #12. I need the volume of my box to be 2 ft^3. The cardboard for the sides and base of the box costs \$.50 per ft^2, and the cardboard for the insert sections costs \$.20 per ft^2. What dimensions give me the cheapest box?