Problems three through eight will not be discussed in lecture until Friday, but will provide you with something to do on the weekend.

1. Find (if possible) the critical values of
$$f(x) = \frac{64}{\sin x} + \frac{27}{\cos x}$$
on $(0, \pi/2)$.

2. Plot the graphs of the following functions
   (a) $y = f(x) = 3x^4 - 4x^3 - 12x^2 + 2$.
   (b) $y = f(x) = 1/(x(x-3)^2)$.
   (c) $y = f(x) = e^{2x-x^2}$.

3. Find the point on the parabola $y = x^2$ that is closest to $(3, 0)$.

4. A box with a square base and open top must have a volume of 32,000 cm^3. Find the dimensions of the box that minimize the amount of material used.

5. A steel pipe is being carried down a hallway 9 ft wide. At the end of the hallway there is a right-angled turn into a narrower hallway 6 ft wide. What is the length of the longest pipe that can be carried horizontally around the corner?

6. A particle has to travel from the point $A = (0, 5)$ to the point $B = (3, 2)$. What is the shortest path from A to B if the constraint that the path must touch the x-axis is imposed?

7. Find the area of the largest rectangle that can be circumscribed about a given rectangle with width w and height h.

8. A painting hung in an art gallery has height h and is hung a distance D above the eye of an observer. How far from the wall should an observer stand in order to maximize the angle subtended at his eye by the painting? This is one measure of where to stand in order to get the best view.