Due 8:10 am, Friday, February 14

Instructions:

- Work each of the following problems on your own paper. You must show all your work. Staple this sheet on the front of your completed take home exam.

- During any integration problem, you must SHOW ALL THE STEPS in the process. You are not allowed to quote integral tables, recursion formulas, MAPLE, or your calculator. You ARE allowed to quote the handout on elementary integrals.

- You are allowed to use your calculator to obtain approximate solutions to any equations.

Problems:

1. A water tank has the shape of a cylinder lying on its side as shown. It is 15 feet long and 8 feet in diameter. If there are 550 ft$^3$ of water in the tank, how deep is the water at the center of the tank?

![Diagram of a cylindrical water tank]

2. Find the following antiderivative.

$$\int \frac{x^3 - 4x^2 + 13x + 13}{x^3 - 4x^2 + 13x} \, dx$$