136.270

Assignment 4 (Sections 16.1-16.4)

Handed: Nov.21 2003. **Due: Nov.26 2003** in class. Show your work; providing answers without justifying them would not be sufficient.

1. [8 marks] Evaluate $\iint_D (4xy^3 - 4x^2y)dA$ where D is the region bounded by $y = -\sqrt{1-x^2}$, $y = \sqrt{1-x}$ and $y = \sqrt{1+x}$. Sketch D.

2. [8 marks] Find the volume V of the solid S bounded by the xy-plane, the cylinder $y = x^2$, and the planes $z = x + 2y$ and $y = 2x + 8$. Sketch S.

3. [8 marks] Use double integrals and polar coordinates to find the area **in the first quadrant** between the lemniscate $r^2 = \cos 2\theta$ and the four-leaf rose $r = \cos 2\theta$.

1 mark for free (to celebrate the end of the term)