

Homework due Wed., Jan.17:

1. On Evans p.435, derive Example 3.
2. Evans p.486, #2
3. Evans p.290, #6
4. On Evans p.435, derive Example 4. Also show that if $u = u(x, y)$ satisfies the minimal surface equation (p.435(10)) with $n = 2$, then u is an I minimizer where $I[w] = \int_U \sqrt{1 + |Dw|^2} dx$.

Hint: For any function $v \in C^1(\bar{U})$ with $v = u$ on ∂U , apply the divergence to the vectorfield $W(x, y, z) = \frac{(-u_x, -u_y, 1)}{\sqrt{1+u_x^2+u_y^2}}$ on regions between the graph u and graph v , noting that W is normal to graph u . You may assume that there are only finitely many such regions.