120A Hwk 7

November 20, 2011

Homework problems due on **Wednesday Nov. 23, 2011**.
Do problems 3.15,17 from the book and the following exercises:

1. Given a surface of revolution $\sigma_1(r,\theta) = (r\cos\theta, r\sin\theta, z_1(r))$ show that there is a function $z_2(r)$ so that σ_1 becomes conformal to the cylinder $\sigma_2(r,\theta) = (\cos\theta, \sin\theta, z_2(r))$.

2. Given a surface of revolution $\sigma_1(r,\theta) = (r\cos\theta, r\sin\theta, z_1(r))$ show that there a function $z_2(r)$ so that σ_1 becomes equiareal to the cylinder $\sigma_2(r,\theta) = (\cos\theta, \sin\theta, z_2(r))$.

3. Compute the mean curvature of the Enneper surface:

$$f(u,v) = \left(u - \frac{1}{3}u^3 + uv^2, -v + \frac{1}{3}v^3 - vu^2, u^2 - v^2\right)$$

Scherk minimal surface:

$$f(u,v) = \left(u, v, \log\frac{\cos v}{\cos u}\right)$$

and Catalan surface:

$$f(u,v) = \left(u - \sin u\cosh v, 1 - \cos u\cosh v, 4\sin\frac{u}{2}\sinh\frac{v}{2}\right)$$

See also page 113 in the book.