

Math 208 Homework 14.

Problems from P.M. Fitzpatrick, Advanced Calculus.

Section 15.3, p.419: Problems: 3, 5, 6(a,b), 9

and the following problems

1. Find f_u and f_v if

$$f(x, y) = x \ln(x^2 - y^2), \quad x = \tan(uv), \quad y = \sin(x - y).$$

2. Show that, if $\vec{F} = (f_1(x_1, x_2, x_3), f_2(x_1, x_2, x_3), f_3(x_1, x_2, x_3))$ has second order derivatives in \mathbb{R}^3 , then

$$\nabla \cdot (\nabla \times \vec{F}) = 0$$

$$\nabla \times (\nabla \times \vec{F}) = \nabla(\nabla \cdot \vec{F}) - \Delta \vec{F}.$$