

Each extra credit problem will be worth one full homework.

1. (Due in lecture Friday, 4/4) no.71 on page 877, parts (a) and (b)

2. (Due in lecture Friday, 4/11) Suppose the altitude of a hill is given by  $f(x, y) = x^2y - 2xy + 5$  corresponding to coordinates  $(x, y)$ . If you begin at coordinates  $(2,1)$  and ascend the hill always hiking in the steepest direction, find a curve in the  $x,y$ -plane describing your path as seen on a map. Express the curve as an expression in  $x$  and  $y$ .

Hint: Temporarily express your path as a parametric curve given by  $x(t)$  and  $y(t)$ . Use the chain rule

$$\frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}}$$

to find a differential equation involving  $y$  and  $x$ . Solve this differential equation.

3. (Due in lecture Friday, 5/2) section 14.4 no.54.