

Quiz 10

1. $f(x,y) = 12x^2 - 4x^3 + 6y^2 + 12xy$

$$f_x = 24x - 12x^2 + 12y$$

$$f_y = 12y^2 + 12x$$

$$f_{xx} = 24 - 24x$$

$$f_{xy} = 12$$

$$f_{yy} = 24y$$

$$24x - 12x^2 + 12y = 0$$

$$12y^2 + 12x = 0$$

$$12(2x - x^2 + y) = 0$$

$$12(x(2-x) + y) = 0$$

$$(1, -1) \quad (0, 0) \rightarrow \text{critical points}$$

$$D_1 = (0)(24) - 144 = -144 \rightarrow \text{saddle point}$$

$$D_2 = (0)(12) - (0) = 0 \rightarrow \text{we don't know!}$$