

"QUIZ" for Lecture 10

NAME: (print!) Fady Besada Section: 22

E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q10FirstLast.pdf) ASAP BUT NO LATER THAN Oct. 8, 8:00pm

1. Find the local maximum and minimum point(s), the local maximum and minimum values, and saddle point(s) of the function

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

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

$$\rightarrow f_y = 12y + 12x$$

$$\rightarrow \text{Critical points: } (0, 0) \text{ and } (1, -1)$$

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

$$\rightarrow f_{xy} = 12$$

$$\rightarrow f_{yy} = 12$$

$$\rightarrow f_{xx}(0, 0) = 24$$

$$\rightarrow f_{xy}(0, 0) = 12$$

$$\rightarrow f_{yy}(0, 0) = 12$$

$$\rightarrow D = (24)(12) - (12)^2 = 144 > 0$$

$$\rightarrow (0, 0) \text{ is a local minimum at } y = 0$$

$$\rightarrow f_{xx}(1, -1) = 0$$

$$\rightarrow f_{xy}(1, -1) = 12$$

$$\rightarrow f_{yy}(1, -1) = 12$$

$$\rightarrow D = 0 \cdot 12 - 144 = -144 < 0$$

$$\rightarrow (1, -1) \text{ is a saddle point at } y = -1$$