NAME: (print!) ___Jennifer Gonzalez___   Section: __23__

E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attach-ment: 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

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

$f_x = 24x - 12x^2 + 12y$ $f_{xx} = 24 - 24x$ $f_{yy} = 12$

$f_y = 12y + 12x$ $f_{xy} = 12$

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

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

$2x - x^2 - x = 0$

$x - x^2 = 0$

$x = x^2$

$x = 1, 0$ $y = -1, 0$

$(1,-1)$ $(0,0)$

$f_{xx}(1,-1) = 0$ $f_{xx}(0,0) = 24$

$f_{xy}(1,-1) = 12$ $f_{xy}(0,0) = 12$

$f_{yy}(1,-1) = 12$ $f_{yy}(0,0) = 12$

$D = 0 \cdot 12 - [12]^2 = -144$ $\therefore$

$D = 24 \cdot 12 - [12]^2 = 149$

$(1,-1)$ saddle point

no local max

no local min (since $f_{xx} = 0$ is not > 0)