NAME: (print!) Prathik Lolla   **Section:** _____

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

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

Find $f_x, f_y, f_{xx}, f_{xy}, f_{yy}$

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

$f_y = 12y + 12x$

$f_{xx} = 24 - 24x$

$f_{xy} = 12$

$f_{yy} = 12$

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

Critical Points: $(0,0)$ and $(1,-1)$

$D = f_{xx}f_{yy} - [f_{xy}]^2$

$f_{xx}(0,0) = 24$ $f_{xy} = 12$
$f_{yy}(0,0) = 12$

$D = (24)(12) - 12^2$

$\underline{D = 144}$

Since $f_{xx} > 0$ and $D > 0$ @ $(0,0)$

$(0,0)$ is a local minimum

$D = f_{xx}f_{yy} - [f_{xy}]^2$

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

$\underline{D = -144}$

Since $D < 0$, $(1,-1)$ is a saddle point