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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

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

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

$f_y = 12y + 12x$

$f_{xx} = 24 - 24x$

$f_{xy} = 12$

$f_{yy} = 12$

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

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

$\underline{-\quad 12x + 12y = 0}$

$12x - 12x^2 = 0$

$12x(1-x) = 0$

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

critical points: $(0,0), (1,-1)$

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

$f_{xy}(0,0) = 12 \qquad D = (24)(12) - 12^2 = 144$

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

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

$f_{xy}(1,-1) = 12 \qquad D = (0)(12) - 12^2 = -144$

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

$(1,-1)$ saddle point

$(0,0)$ local minimum

no local maximum