

"QUIZ" for Lecture 10

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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

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

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

$\begin{cases} 24x - 12x^2 + 12y = 0 \\ 12y + 12x = 0 \end{cases} \quad \begin{matrix} x = 0, 1 \\ y = 0, -1 \end{matrix} \quad (0, 0) (1, -1)$

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

$D(0, 0) = 144 > 0$, $D(1, -1) = -144 < 0$

$f(0, 0) = 0$, $f(1, -1) = 2$

Since $f_{xx}(0, 0) > 0$, $f(0, 0)$ is a local minimum point which is equal to 0, $f(1, -1)$ is a saddle point which is equal to 2.