

Quiz #05 – MATH 2421
Summer 2006

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Name : _____

Directions: No books, notes, or technology (calculators). Show all algebra!

(#1) Let

$$z = f(x, y) = xy + x^2 - \frac{y^3}{3} - x.$$

(a) [10 pts.] Find both critical points.

(b) [10 pts.] Use the Second Partial Test $[d = f_{xx}f_{yy} - (f_{xy})^2]$ to classify both critical points. Fill out the chart.

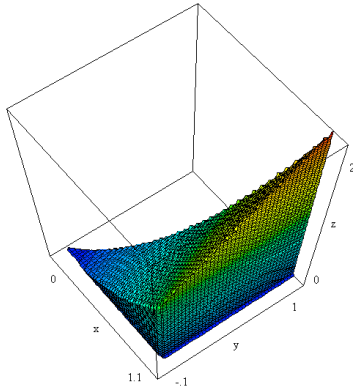
Some choices are:

$d > 0, f_{xx} > 0 \Rightarrow$ Local minimum. [You should know the other one already.]

$d < 0 \Rightarrow$ Saddle point.

x	y	$f_{xx} = 2$	f_{yy}	f_{xy}	d	Result
		2				
		2				

(#2) [20 pts.] This surface is bounded from below by $z = 0$ and above by $z = x^2 + xy$.



The region of integration is a triangle in the xy -plane bounded by $y = x$, $y = 0$, and $x = 1$.

Find the volume trapped beneath the surface $z = f(x, y) = x^2 + xy$.

(#3) [20 pts.] Evaluate:

$$\int_0^{\sqrt{\ln(2)}} \int_0^{2y} e^{-y^2} dx dy$$