

Quiz #06 – MATH 2421
Spring 2008

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Name : _____

Directions: No calculators, books, or notes. Show algebra. Be sure to highlight your final answer!

1. Consider the two variable function

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

To find the critical points, we must solve the system:

$$f_x = 0 \quad \text{and} \quad f_y = 0.$$

- (a) [2 pt.] Get the two equations and then substitute one into the other. It's easiest to find x first. It will give you TWO cases.

The point $(1, 1)$ is a critical point. You won't credit for that one!

Find the other critical point.

- (b) [3 pts.] Now use the Second Partials Test to classify the critical point $(1, 1)$.

$$d = f_{xx}f_{yy} - (f_{xy})^2$$

$d > 0, f_{xx} > 0 \Rightarrow$ local minimum

$d > 0, f_{xx} < 0 \Rightarrow$ local maximum

$d < 0 \Rightarrow$ saddle

x	y	f_{xx}	f_{yy}	f_{xy}	d	Result
1	1					

2. [5 pts.] Evaluate carefully.

$$\int_0^1 \int_0^2 x e^{xy} dy dx$$