FULL NAME:_____

NEW YORK CITY COLLEGE OF TECHNOLOGY

Math 2675: Calculus III
E596, Fall 2015

Extra Credit Assignment [Due 12/8/2015] **Professor:** Caner Koca

This assignment is worth 12 points. It will be added to your 3rd test score!

1. (12pts) The following table of values is given for a function $f(x, y)$. Based on the data in the table, (a) find all critical points (b) determine whether there is a local minimum, local maximum or a saddle point. (**Note:** You must show all your work explaining briefly how you find these points. You may lose points for insufficient explanations and incorrect statements.)

(x, y)	$f(x, y)$	f_x	f_y	f_{xx}	f_{xy}	f_{yy}
$(3, 6)$	5	0	-4	-9	-16	-7
$(8, 1)$	12	0	0	-2	4	-12
$(0, 0)$	-3	18	2	9	1	0
$(-2, 9)$	-10	0	0	12	3	0
$(-3, 1)$	0	0	0	0	-1	44
$(1, 0)$	1	0	3	-9	4	3
$(0, -2)$	3	0	0	8	-3	2
$(0, -1)$	12	12	3	9	2	40
$(0, 1)$	0	0	-4	0	0	10

2. Find the **maximum and minimum values** of the function $f(x, y) = \sin^2 x + \sin^2 y$ subject to the constraint $x + y = \pi$.

3. Evaluate the integral $\iint_R xy \, dA$ where R is the region enclosed by the lines $y = \dfrac{x}{3}$, $y = 2x - 8$ and the x-axis.

4. Let U be a solid in the first octant which is bounded above by the plane $12x + 3y + 2z = 24$ and below by the xy-plane. Write a double integral which represents the volume of this solid. Then convert it into an iterated integral. (**You do not need to compute the integral**.)

5. Sketch the curve $r = 4 - 4\sin(2\theta)$ on the xy-plane. YOU MUST SHOW AND EXPLAIN YOUR WORK. **Correct graph without sufficient explanation will get zero credit.**

6. Compute the integral

$$\iint_R \cos(x^2 + y^2 + \pi) \, dA$$

where R is the region bounded by the x-axis and the **lower semicircle of radius 2** centered at the origin. (Hint: Use polar coordinates)