Math 208 Test 2 **Fall 2013**

Name:_____ Score:_____

Instructions: You must show supporting work to receive full and partial credits. No text book, notes, formula sheets allowed.

1(15pts) Verify that $(0, -1/2)$ is a critical point of the function $f(x, y) = y^2 + y + x^2y - \frac{2}{3}x^3$, and then use the second derivative test to determine if it is a local max, min, or saddle point.

2(15pts) Use the Lagrange multiplier method to find the constraint minimum of function $f(x, y) = 2x + y$ subject to $x^2 + y^2 = 5$.

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3(20pts) (a) Sketch the region of the integral $\int_0^2 \int_{y^2}^4 e^{x^{3/2}} dxdy$.

(b) Change the order of the iterated integral to $dydx$. Do not evaluate the integral.

4(15pts) The region R is bounded by the x-axis, the line $y = 2x$, and the circle $x^2 + y^2 = 5$ in the first quadrant. Sketch the region and set up an integrated integral in the polar coordinate for the integral $\iint_R \sqrt{x^2 + y^2} dA$. Do not evaluate the integral.

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5(15pts) Set up an iterated integral in the order of $dxdydz$ for the triple integral $\iiint_W xyzdV$ for the solid W which is bounded by the plane $x + 2y + 3z = 6$ in the first octant. Sketch the solid. Do not evaluate the iterated integral.

6(20pts) (a) An object takes 2 second to move in a straight line from point $(1, 2, 3)$ to point $(3, 2, 1)$. Write a parameterized equation for the motion.

(b) Verify that $\vec{r}(t) = \langle t^2, t\rangle$ is a flow for the vector field $\vec{F}(x, y) = \langle 2y, 1\rangle$

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2 pt Bonus Question: The population of Nebraska is about: (a) 1 (b) 2 (c) 3 (d) 4 millions. (*... The End*)