Math 210 E1 S92 — Calculus III — Exam #2 (Ch. 12) — Hanson — page 1 of 2

Show work on this sheet in 50 minutes $((16 + 20 + 4 \times 16 = 100$ *points).*

Name ________________________________. *SocSecNo.* ________________________.

1. Find the Point on the Plane $3x - 2y + 4z = 5$ that is closest to the Point (-4, 5, 6).

2. Find the Positions of Local Extrema and Saddle Points of $f(x, y) = 2y^3 + x^2y + 4y^2 + 3x^2$ (identification of critical points is part of the problem).

3. Find the Direction of the Minimum Rate of Change of $f(x, y, z) = \frac{x}{y} - z^2$ at (3, -1, 2).

4. If $e^{x+2y+3z} = \cos(3x+2y+z)$, find the differential $dz =$

5. If $z = \sin(xy^2)$, $x = r\cos\theta$ and $y = r\sin\theta$, find

(a) $\frac{\partial z}{\partial r}$

(b) $\frac{\partial z}{\partial \theta}$

6. Find the Limit if it Exists, else show that it Does Not Exist:

$$\lim_{(x,y)\to(0,0)} \frac{2xy}{x^2+y^2} =$$