

Math 173 - Quiz 6

March 3, 2016

Name key Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (4 points) Identify the quadric surface described by each equation.

(a) $\frac{y^2}{4} = \frac{x^2}{16} + 4z^2$ **ELLIPTIC CONE**

(b) $2x^2 + 4y^2 + 8z^2 = 14$ **ELLIPSOID**

(c) $\frac{y^2}{4} - x^2 - \frac{z^2}{8} = 1$ $X^2 + \frac{Z^2}{8} = -1 + \frac{Y^2}{4}$ **HYPERBOLOID OF TWO SHEETS**

(d) $z = x^2 + 4y^2$ **ELLIPTIC PARABOLOID**

2. (1 point) Choose any one of the quadric surfaces above and describe one of its nontrivial level curves.

(d) $z = 4 \Rightarrow x^2 + 4y^2 = z$

$\frac{x^2}{4} + y^2 = 1$

ELLIPSE, CENTERED AT ORIGIN, PASSING THROUGH $(\pm 2, 0)$ & $(0, \pm 1)$.

3. (3 points) Compute the limit:

$\lim_{(x,y) \rightarrow (1,1)} \frac{x^2 + xy - 2y^2}{2x^2 - xy - y^2}$ $\frac{0}{0}$

$\lim_{(x,y) \rightarrow (1,1)} \frac{(x+2y)(x-y)}{(2x+y)(x-y)} = \lim_{(x,y) \rightarrow (1,1)} \frac{x+2y}{2x+y} = \frac{3}{3} = \boxed{1}$

4. (2 points) Determine the domain: $f(x,y) = \frac{1}{\sqrt{9-x^2-y^2}}$

$9 - x^2 - y^2 > 0 \Rightarrow x^2 + y^2 < 9$

$\{(x,y) : x^2 + y^2 < 9\}$

