Name: key PID:

Summer 2012 – Math 234 – Quiz 3

Be sure to show your work!

1. (10 points) Calculate the limit below.

$$\lim_{\substack{(x,y)\to(3,6)\\ x+y\neq 9}} \frac{x+y-9}{\sqrt{x+y}-3}$$

$$= \lim_{\substack{(x,y)\to(3,6)\\ x+y\neq 9}} \frac{(\sqrt{x+y}+3)(\sqrt{x+y}-3)}{\sqrt{x+y}-3}$$

$$= \lim_{\substack{(x,y)\to(3,6)\\ x+y\neq 9}} (\sqrt{x+y}+3)$$

$$= \sqrt{3+6}+3 = 6$$

2. (6 points) Let $f(x,y)=\sin^{-1}(y/x)$, where $0<y<x$, calculate the 2nd derivatives f_{xy} and f_{yx}.

$$f_y = \frac{1}{\sqrt{1-y^2/x^2}}\cdot\frac{1}{x} = \frac{1}{\sqrt{x^2-y^2}}$$

$$f_{yx} = \left(-\frac{1}{2}\right)(x^2-y^2)^{-\frac{3}{2}}\cdot 2x$$

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

$$f_{xy} = f_{yx}$$

3. (4 points)True or False

T☒ F☐ (1) The domain of the function $f(x,y)=\sqrt{16-x^2-4y^2}$ is bounded.

$x^2+4y^2 \le 16$ ellipse bounded