

Calc 3: Assignment 13/14

Note Title

10/6/2011

① For $f(x,y) = \ln(x+y-1)$

a) Find $f(1,1)$ and $f(e,1)$

b) Find / sketch the domain of f

c) What is the range of f ?

② Sketch the domain of

a) $f(x,y) = \sqrt{y} + \sqrt{25-x^2-y^2}$

b) $f(x,y) = \ln(9-x^2-9y^2)$

③ Sketch the graphs of,

a) $f(x,y) = 10-4x-5y$

b) $f(x,y) = 3-x^2-y^2$

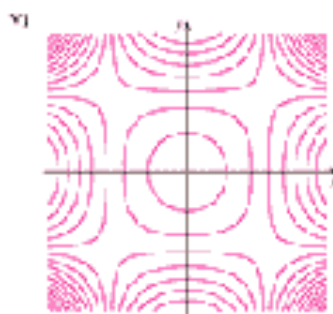
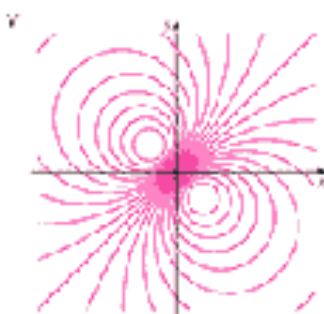
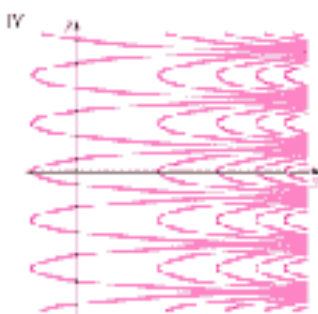
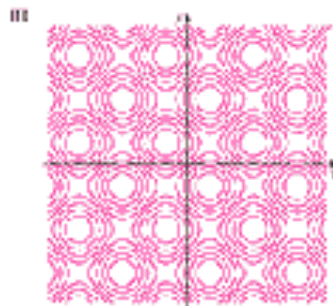
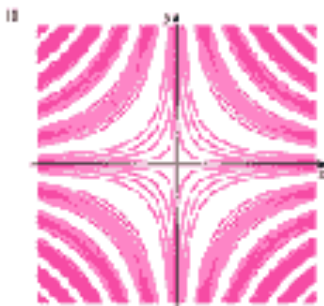
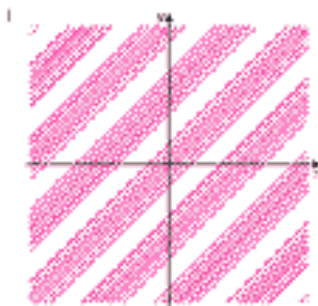
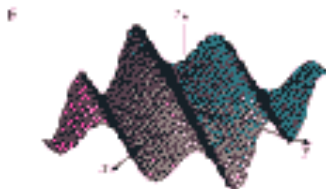
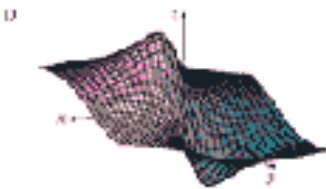
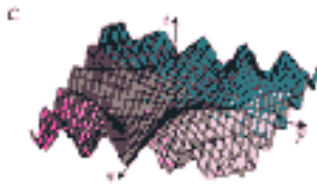
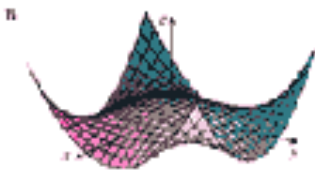
④ Draw several levels of the contour plot for

a) $f(x,y) = y-2x$

b) $f(x,y) = x^3-y$

c) $f(x,y) = ye^x$

⑤ Match the functions to the contour plots:



⑥ Find the following limits or show that they do not exist.

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

$$b) \lim_{(x,y) \rightarrow (0,0)} \frac{xy \cos(y)}{3x^2 + y^2}$$

$$c) \lim_{(x,y) \rightarrow (0,0)} \frac{6x^3y}{2x^4 + y^4}$$

$$d) \lim_{(x,y) \rightarrow (0,0)} \frac{x^4 - y^4}{x^2 + y^2}$$

$$e) \lim_{(x,y) \rightarrow (0,0)} \frac{xy^4}{x^2 + y^8}$$

⑦ Is the following function continuous:

$$f(x,y) = \begin{cases} \frac{5x^2y}{x^2+y^2} & , \text{ if } (x,y) \neq (0,0) \\ 0 & , \text{ if } (x,y) = (0,0) \end{cases}$$

⑧ Find all 1st-order partial derivatives of:

$$a) f(x,y) = x^4y^3 + 8x^2y$$

$$b) f(x,y) = \frac{x-y}{x+y}$$

$$c) f(x,y,t) = x \sin(y-z)$$

$$d) f(x, y, z) = xy z^2 \tan(z)$$

9) Find all 2nd-order partial derivatives of:

$$a) f(x, y) = x^3 y^5 + 2x^4 y$$

$$b) f(x, y) = x e^{xy}$$

c) Verify that $f_{xy} = f_{yx}$ in the above examples.