MA 16020 Quiz 9 (Lessons 18-20)

Write your name, section number (054 for 11:30, 039 for 12:30), and
quiz number on the top of your quiz, **front and back.**
You may use a one-line calculator.

1. Sketch several (at least two) level curves of the function
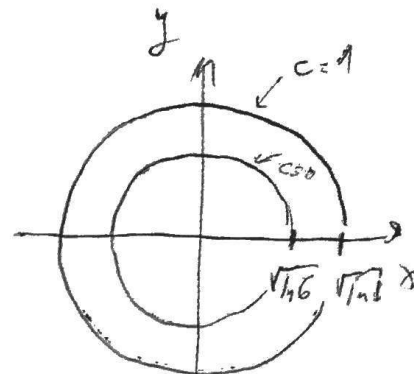
$$f(x,y) = \frac{e^{x^2}e^{y^2}}{2} - 3$$

and describe (in words) their shape.

2. Compute f_{xx}, f_{yx} for

$$f(x,y) = xy\ln(xy) + \cos(xy) \ .$$

1. $\underline{C = 0}$ $\quad 0 = \frac{e^{x^2}e^{y^2}}{2} - 3$ $\quad e^{x^2+y^2} = 6$

$\quad\quad\quad\quad 3 = \frac{e^{x^2}e^{y^2}}{2}$ $\quad\quad \underline{x^2+y^2 = \ln(6)}$

$\underline{c=1}$ $\quad 1 = \frac{e^{x^2+y^2}}{2} - 3$ $\quad\sim)\quad \underline{x^2+y^2 = \ln(8)}$

*)

circles centered at
the origin

2.

$f_x = y\ln(xy) + xy\cdot\left(\frac{1}{xy}\right)\cdot y + \left(-\sin(xy)\cdot y\right)$

$\quad = y\ln(xy) + y - y\sin(xy)$

$f_{xx} = y\cdot\frac{1}{xy}\cdot y + 0 - y^2\cos(xy) = \frac{y}{x} - y^2\cos(xy)$

$f_{yx} = f_{xy} = \ln(xy) + y\frac{1}{xy}\cdot x + 1 - \sin(xy) - y\cdot(\cos(xy)\cdot x)$

$\quad = \ln(xy) + 2 - \sin(xy) - xy\cos(xy)$