HOMEWORK 3
CALCULUS III
DUE 01-23

(1) (a) In your own words, explain what you can conclude, and why, about the behaviour of a function by observing the spacing of its level curves.

(b) The level curves of $z = x^2 + y^2$ are *more* tightly packed than those of $z = \sqrt{x^2 + y^2}$ for large z-values, but *less* tightly packed for small z-values. Use your answer to (a) to explain what this means about the graphs.

(2) Give an example of:

- a formula for a function $z = f(x, y)$, and
- two different paths through $(3, 4)$

such that the limits of $f(x, y)$ as $(x, y) \to (3, 4)$ along both paths are the same, but $\lim_{(x,y)\to(3,4)} f(x, y)$ does not exist. Explain how you know that the limit doesn't exist.

- **Eleven** book problems: #13.1.45–48, 53, 56, 85, 86; #13.2.29, 32, 84.