

Math 203 — Introduction to multivariable functions

Problem 1. Consider the function $f(x, y) = \sqrt{x^2 + y^2}$.

- a. What are the domain and range of f ?
- b. Make a contour plot of the level curves of f using $c = 0, 1, 2, 3, 4, 5$.
- c. What is different about this contour plot compared to that of $g(x, y) = x^2 + y^2$?
- d. Use CalcPlot3D to make a sketch of the graph of f .
- e. Sketch the graphs of $h(x, y) = -\sqrt{x^2 + y^2}$ and $k(x, y) = 1 - \sqrt{x^2 + y^2}$.

Problem 2. Consider the function $f(x, y) = x + y$.

- a. Make a contour plot using level curves $c = -2, -1, 0, 1, 2$.
- b. What do you believe the graph of f looks like?
- c. Use CalcPlot3D to make a sketch of the graph of f .

Problem 3. Match the surfaces (a)-(e) with their corresponding contour diagrams (I)-(V) shown below.

