

## CS164 LESSON 3.2 - PRECLASS WORK EXERCISES

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Complete the exercises below and be prepared to share your results during the class.

- (1) For each of the functions below, plot a diagram of their level sets and determine whether or not the functions are coercive. You may use a graphical package to plot the level sets.
  - (a)  $f(x, y) = x + y$
  - (b)  $f(x, y) = x^2 + 4y^2$
  - (c)  $f(x, y) = xy$
  - (d)  $f(x, y) = x^2 - y^2$
  - (e)  $f(x, y) = x^2 + 2xy + y^2$
  - (f)  $f(x, y) = x^4 + 2xy + y^4$
- (2) Prove that the following function is coercive and describe its sublevel sets mathematically (no need to plot them).

$$f(x, y, z) = e^{x^2+y^2+z^2}$$