EXERCISES AND COMPUTATIONAL PROBLEM

1) EXERCISES:
   All those marked in **BOLD** in the course description in "Course Readings".

2) COMPUTATIONAL PROBLEM:

$$f(x,y) = \frac{x^2}{2\alpha^2} + \frac{(y - \gamma x^2)^2}{2\beta^2}$$

Initial point: $(x_0, y_0) = (2,2)$

For the function given above, consider the following cases:

   A. α=3, β=1, γ=0
   B. α=50, β=1, γ=0
   C. α=3, β=1, γ=1
   D. α=3, β=1, γ=20
   E. α=50, β=1, γ=1
   F. α=50, β=1, γ=20

For each one of them:

1. Plot the isosurfaces : f=1, f=3
2. Solve minimize f(x,y), using Steepest Descend with stepsize constant equal to (a) 3, (b) 0.1, (c) 0.01
3. Solve minimize f(x,y), using Steepest Descend with Armijo stepsize.
4. Solve minimize f(x,y), using Newton's method with stepsize equal to 1.
5. Solve minimize f(x,y), using Newton's method with Armijo stepsize.

Choose the Armijo rule constants as you wish or use: s=1, σ=0.1, β=0.5.

Comment on what you find of interest.