Assignment 9 (Due on the week November 16– 21)

For each of the following functions find the critical points and classify them as local max, local min, saddle point, or "can't tell". What can you say about their global properties (in other words are at least some of them global extrema)?

1. $f(x, y) = x^4 + x^2 - 6xy + 3y^2$,
2. $f(x, y) = x^2 - 6xy + 2y^2 + 10x + 2y - 5$,
3. $f(x, y) = xy^2 + x^3y - xy$,
4. $f(x, y) = 3x^4 + 3x^2y - y^3$,
5. $f(x, y, z) = x^2 + 6xy + y^2 - 3yz + 4z^2 - 10x - 5y - 21z$,
6. $f(x, y, z) = (x^2 + 2y^2 + 3z^2)e^{-(x^2+y^2+z^2)}$.