Problem Set 3 - PS & SOC Math Prefresher

This problem set requires more extensive work by hand, feel free to submit the responses as a scanned pdf (there are apps for this or you can convert to pdf) or a photo format. Due at the beginning of class on Day 7.

1. Derivative Foundations
   (a) What is a derivative? Why might we find it useful?
   (b) Give an example of a derivative we might care about (think about the education and salary graphs from lecture)
2. Derivatives by hand : Compute manually, using the formula for a derivative (i.e. $lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$).
   (a) $f(x) = x^3$
   (b) $f(x) = 2x^2 + 4$
   (c) $f(x) = x - 9x^2$
3. Derivatives using the formulas: Compute these using the rules from class.
   (a) $f(x) = 2x^2 + 7x + 9$
   (b) $f(x) = 3x^2$
   (c) $f(x) = x^3$
   (d) $f(x) = 2x^2 + 4$
   (e) $f(x) = x - 9x^2$
   (f) $f(x) = ln(x)$
   (g) $f(x) = e^{3x}$
   (h) $f(x) = 2e^{-2x} - x^{0.5}$
   (i) $f(x) = (3x^4 - 6x + 2)(x^2 - 4)$
   (j) $f(x) = ln(e^x)$
   (k) $f(x) = (3x^4 - 6x + 2)(x^2 - 4)^{-1}$
4. Partial Derivatives: Calculate each derivative first with respect to x, then with respect to y.
   (a) $f(x, y) = x^2 + 3xy - 4$
   (b) $f(x, y) = x^3y^2 - x - y$

FYI: you will be getting a survey about math camp that will ask you to consider how well math camp functioned, how well it helped you prepare for the fall quarter, and what we can do to improve the overall experience. It will be helpful if you are as specific as possible, so take some time to think things over.