Problem Set 6
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1) $f(x) = x(1-x)$ ← Use Power rule

$= x - x^2$ ←

$f'(x) = 1 - 2x$

← Set $f(x)$ to zero, solve for x

$0 = 1 - 2x$

$-1 \quad -1$

$\frac{-1}{-2} = \frac{-2x}{-2}$

$x = \frac{1}{2}$ → Dictator should half of the tax revenue to maximize his expected happiness

2) $f(m) = (x_1 - m)^2 + (x_2 - m)^2 + (x_3 - m)^2$

$= 3(x-m)^2$

$f'(m) = 6(x-m)$

$f''(m) = 6$

3) $y = 2x_1 + 5x_2 - 4x_1 x_2 + \varepsilon$

$2x_1 + 5 - 4x_1$

$y = -2x_1 + 5$ → When you increase x_1 by 1 unit, y goes down 3 units

Garret Vander Kamp (Time series data guy)

Marx ROP Paper

- Idea of how to run chi-squared test on sample of years in U.S. comparing relationship between change in ROP from previous year & change in organic composition of capital? Not sure? Follow up w/ professors b/c this could be IT
  - Might have to run a different test?
  - How do I create a good enough sample?
  - How do I make it big enough?
  - Will have to be based on industry wide data? Or can I make a sample of X number of large companies & replicate the sampling a bunch of times?

- Might be able apply the chi-squared test to observe relationship between individual company's increasing debt/investment ratio over time to either change in OCC from previous year or FROP from previous year, or both? Not sure what to do!!!

  - Can I even effectively observe changes in individual companies in relation to industry-wide phenomena?
    - I think so??
  - Will my results tell me what I'm actually trying to find?
  - WHAT IF I MULTI-LAYER THE OBSERVATIONS?
    - EX: P(↑ Debt/Investment | (↑OCC & ↓ROP))
      - Other possible combos???
      - Investment in Finance / Investment in productive assets