Hoemwork #1

Due Date

Due at the begining of class Sept 3, 2015. You may submit homework in groups of up to – choose wisely as your group must remain the same over the course. We will have a homework quiz for your individual grade on Sept 3 at the beginning of class.

Part 1 - Graphing Consumer Budget Constraints

Malcolm is on his way to the grocery store with \$200 available to purchase food. Malcolm only consumes two goods - frozen lasagnas and cokes. Frozen lasagnas cost \$5 each, and cokes cost \$2 each. For the questions below, use l to denote the number of lasagnas that Malcolm buys, and c to denote the number of cokes.

1. Write out the equation for Malcolm's budget constraint, with all expenditures on the left hand side and Malcolm's assets on the right hand side.
2. Rearrange the budget constraint into slope-intercept form, where c is the **dependent** variable and l is the **independent** variable.
3. Graph Malcolm's budget constraint with cokes on the vertical axis and frozen lasagna on the horizontal axis. Be sure to label the axes, the vertical intercept, and the slope of the budget constraint.

Part 2 - Simple Derivatives

Take the derivative for each of the functions below.

4. $f(x) = 5$
5. $f(x) = 10x$
6. $f(x) = 4x + 3$
7. $f(x) = 2x^2 - 3x - 1$
8. $f(x) = x^4 + 6x^3 + 0$

Part 3 - Slightly More Complicated Derivatives

9. $f(x) = \ln(x)$
10. $f(x) = 5\ln(x)$
11. $f(x) = 9\ln(3x)$

12. $f(x) = x^{\frac{1}{2}}$
13. $f(x) = 3x^{\frac{1}{3}} - 12x$
14. $f(x) = 2x^2 \ln(3x)$
15. $f(x) = \ln(x^2)$
16. $f(x) = (8x - 1)^4$

Part 4 - Partial Derivatives

17. Compute $\frac{\partial}{\partial x}$ of the function $f(x, y) = 14x^3 + y^2$
18. Compute $\frac{\partial}{\partial y}$ of the function $f(x, y) = 14x^3 + y^2$
19. Compute $\frac{\partial}{\partial x}$ of the function $f(x, y) = x^2y + 3x - 2y + 6$
20. Compute $\frac{\partial}{\partial y}$ of the function $f(x, y) = x^2y + 3x - 2y + 6$
21. Compute $\frac{\partial}{\partial c}$ of the function $u(c, l) = \ln(c) + \ln(l)$
22. Compute $\frac{\partial}{\partial l}$ of the function $u(c, l) = \ln(c) + \ln(l)$
23. Compute $\frac{\partial}{\partial c}$ of the function $u(c, l) = \alpha \ln(c) + \beta \ln(l)$, where α and β are any constants.
24. Compute $\frac{\partial}{\partial l}$ of the function $u(c, l) = \alpha \ln(c) + \beta \ln(l)$, where α and β are any constants.
25. Compute $\frac{\partial}{\partial K}$ of the function $F(K, N) = K^{\frac{1}{2}} N^{\frac{1}{2}}$
26. Compute $\frac{\partial}{\partial N}$ of the function $F(K, N) = K^{\frac{1}{2}} N^{\frac{1}{2}}$
27. Compute $\frac{\partial}{\partial K}$ of the function $F(K, N) = 2K^{\frac{1}{2}} N^{\frac{1}{2}}$
28. Compute $\frac{\partial}{\partial N}$ of the function $F(K, N) = 2K^{\frac{1}{2}} N^{\frac{1}{2}}$
29. Compute $\frac{\partial}{\partial K}$ of the function $F(K, N) = K^{\theta} N^{1-\theta}$, where θ is some constant.
30. Compute $\frac{\partial}{\partial N}$ of the function $F(K, N) = K^{\theta} N^{1-\theta}$, where θ is some constant.