Supplement to Homework #1 - Chapter 3 material
Due Friday 1/26

Take the quiz on the Mankiw web site for Chapter 3 - have the results emailed to me at: kdsalyer@ucdavis.edu

1. Question 1, Chapter 3 appendix (p. 76).
2. Question 2, Chapter 3 appendix (p. 76).
3. Prove Euler’s Theorem for a production function that exhibits constant returns to scale. To do this, use the definition of constant returns to scale: \( F(\lambda K, \lambda L) = \lambda F(K, L) \) where \( \lambda > 0 \) and differentiate both sides of the expression with respect to \( \lambda \). Evaluate the derivatives at \( \lambda = 1 \) to derive Euler’s theorem (this is legitimate since the definition of constant returns to scale holds for any value of \( \lambda \)).

4. A function \( f(x, y) \) is said to be homogeneous of degree \( r \) if the following is true: \( f(\lambda x, \lambda y) = \lambda^r f(x, y) \). Clearly, a production function that exhibits constant returns to scale is a homogeneous function of degree 1. Prove for the Cobb-Douglas production function, \( F(K, L) = K^\alpha L^{1-\alpha} \), that the functions defined by the marginal products of capital and labor are homogeneous of degree 0.

5. Question 3, Chapter 3 (p. 71).
6. Question 5, Chapter 3 (p. 71).
7. Question 6, Chapter 3 (p. 71).
8. The use of the Cobb-Douglas production function is based on two attributes. What are these and what are their importance?
9. Suppose the current labor force is 100 million and the unemployment rate is 5%. Which of the following will lead to the greatest reduction in the unemployment rate:
   a. 1 million unemployed find jobs.
   b. 2 million unemployed stop looking for work.
   c. 5 million people join the labor force and all find work.
   d. 10 million people join the labor force and half find work.

What does your answer imply about the unemployment rate as a measure of economic well-being?