SECOND TEST. ECON 335, FALL 2014. NAME: _____

Answer in the space provided. Show correct work for full credit. Box your final answers.

1. The life cycle and labor supply. Suppose that Carl's life can be divided into two distinct time periods, period 1 and period 2. Defining e_1 as leisure in period 1, e_2 as leisure in period 2, and c as total lifetime consumption, Carl's preferences can be represented by the utility function $U = {e_1}^3 {e_2}^2 c^5$. Suppose a simple budget constraint of $c = (1 - e_1)w_1 + (1 - e_2)w_2 + k$, where w_1 is Carl's wage rate in period 1, w_2 is Carl's wage rate in period 2, and k is Carl's non-labor income.

a) Find the functions $c(w_1, w_2, k)$, $e_1(w_1, w_2, k)$, and $e_2(w_1, w_2, k)$, which give Carl's optimal consumption, period 1 leisure, and period 2 leisure, as they depend on both wage rates and non-labor income, in the absence of a corner solution.

b) Find Carl's optimal c, e_1, and e_2 if $w_1 = 400$, $w_2 = 600$, and $k = 200$.

c) Find Carl's optimal c, e_1, and e_2 if $w_1 = 400$, $w_2 = 600$, and $k = 800$. (Note: This is reasonably challenging, but the numbers should work out okay in the end.)

2. Compensating wage differentials. I have the (expected) utility function $U = w - 5r^2$, where w is the wage I receive, and r indicates the level of workplace risk I experience. I work for one of many perfectly competitive firms that have the per-worker profit function $\Pi = 160r^{1/2} + 60 - w$. Since these firms are perfectly competitive, they pay me a wage such that they make zero profit from hiring me, and I can choose my level of workplace risk.

a) Find my wage as a function of workplace risk.

b) Find the level of workplace risk I would choose to maximize my expected utility.

c) If I choose the risk level from part (b), find my wage w and utility U.

d) With r on the horizontal axis and w on the vertical axis, sketch the firm's isoprofit curve and my indifference curve at the agreed-on wage-risk combination, to the right here →

e) Find my new wage and expected utility if the government makes it illegal for any workplace to have a risk level above $\bar{r} = 1$, but everything else remains the same as above.

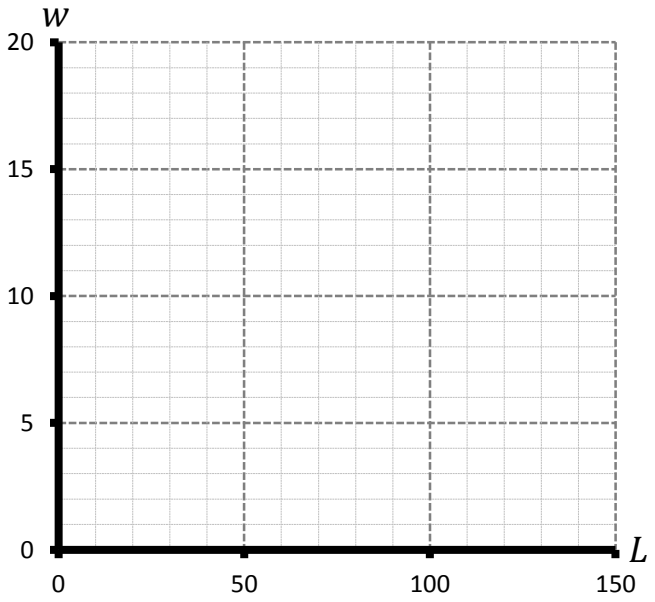
f) Identify two strong assumptions in this model (as developed in chapter 8 of the Ehrenberg-Smith text), and explain why dropping each assumption could lead to different conclusions about the wisdom of workplace safety regulations.

3. Immigration and the labor market. Consider a market for a particular type of labor, in a particular place. Demand for labor can be represented by the marginal revenue product of labor function $MRP_L = 17 - \frac{1}{20}L$, where L is the quantity of labor. Domestic supply of labor, supply of labor from immigrants, and total supply of labor can be represented by the marginal cost of labor functions $MC_L^d = 2 + \frac{1}{10}L$, $MC_L^i = 2 + \frac{3}{10}L$, and $MC_L^t = 2 + \frac{3}{40}L$.

a) Find the equilibrium wage, employment, firm surplus, worker surplus, and total economic surplus if immigrants are not allowed to work.

b) Find the equilibrium wage, employment, firm surplus, domestic worker surplus, immigrant worker surplus, total domestic economic surplus (excluding immigrants' surplus), and total economic surplus (including immigrants' surplus) if immigrants are allowed to work.

c) On the blank graph to the right, draw MRP_L, MC_L^d, and MC_L^t. For the case in which immigration is allowed, use different shading to indicate firm surplus (FS), domestic worker surplus (WS^d), and immigrant worker surplus (WS^i). Draw a thick boundary around the area of the graph representing the change in domestic economic surplus.



d) Quantify the gains and losses by different groups that result from immigration. Does allowing immigration increase or decrease domestic economic surplus? Aside from the numbers, explain the intuition behind your answer as clearly as possible.

4. Education and signaling. Suppose that, at a particular job, the productivity of a low-ability worker is $\pi_L = 400$, and the productivity of a high-ability earner is $\pi_H = 520$. Suppose that the cost of education for a low-ability person is $c_L(e) = 4e$, and the cost of education for a high-ability person is $c_H(e) = 3e$, where e represents educational attainment. What is the range of values of e^* that firms could require that would allow them to effectively distinguish the high-ability workers from the low-ability workers?

5. Education and age/earnings profiles. The text gives a graph of average earnings for (full-time, year-round, male, American) workers as a function of age, for four different education levels: some high school, high school graduate, some college, and college graduate. We find that (a) earning *differences* between different educational groups tend to increase with age ("fanning out"), and that (b) the functions are concave, i.e. that earnings tend to increase more slowly with age at higher ages. Use human capital theory to explain these findings.

6. Education and present-orientedness. What is meant in the text by "present-orientedness"? What kind of discount rate does a highly present-oriented person have? Using human capital theory, explain why a more present-oriented person is likely to acquire less education than a more future-oriented person, all else being equal.