

14.01 Fall 2010
Problem Set 8

1. (36 points) Two firms, A and B, are competing in the production of a homogenous good. The good's marginal cost for both firms is equal, $MC = \$25$. Assuming linear reaction functions, describe what would happen to output and price in each of the following situations if the firms are in (i) collusive equilibrium, (ii) Cournot equilibrium, (iii) Bertrand equilibrium.
- (a) (4 points for each of (i)-(iii)) The demand curve shifts to the left.
 - (b) (4 points for each of (i)-(iii)) Because it invents a new and improved machine, the marginal cost at firm B decreases to \$20.
 - (c) (4 points for each of (i)-(iii)) Costs in the entire industry increase due to an increase in wages.

Problem 1 by MIT OpenCourseWare.

2. Problem removed due to copyright restrictions. This content is presented in audio form in the Solution Video for Problem Set 8, Problem 2.
3. (28 points) Suppose a perfectly competitive labor market has a demand curve of $L^D = 120 - 2w$ and a supply curve of $L^S = 8w$, where w is the wage rate in dollars and L is the quantity of labor in person-hours.
- (a) (2 points) What are the equilibrium values of the wage and employment?
 - (b) (4 points) Suppose the government imposed a minimum wage of \$14 per hour. Now what are the equilibrium values of the wage and employment?
 - (c) (8 points) Repeat part (a), assuming now that the market is a monopsony.
 - (d) (8 points) Repeat part (b), assuming now that the market is a monopsony.
 - (e) (6 points) Does the imposition of the minimum wage decrease employment here under perfect competition? What about under monopsony? Give a brief intuitive explanation for your answer and why it may be different under the two different market structures.

Problem 3 courtesy of William Wheaton. Used with permission.

4. (11 points) Suppose you face the following lottery. You can earn 1 of 3 possible grades in this class: an "A", a "C", or an "F", with the following probabilities:

$$\pi_A = \frac{2}{10}, \quad \pi_C = \frac{6}{10}, \quad \pi_F = \frac{2}{10}$$

Your current wealth (w) is \$400. If you receive an "A", you gain (e.g. I pay you) \$500. However, if you get an "F", you lose (e.g. you pay me) \$300. If you receive a "C", you **DO NOT GAIN OR LOSE** anything. Assume your utility function, defined over wealth, is $U(w) = \sqrt{w}$.

- (a) (6 points) What is your expected utility (EU)? [Hint: be sure to calculate your total wealth in each "state".]
- (b) (5 points) What is the certainty equivalent level of wealth (w^*), that is, the guaranteed payoff at which a person is "indifferent" between accepting the guaranteed payoff and their expected utility from (a)?

MIT OpenCourseWare
<http://ocw.mit.edu>

14.01SC Principles of Microeconomics
Fall 2011

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.