

FULL NAME _____

ID NUMBER _____

SIGNATURE _____

Final Exam
January 15, 2014

Instructions

- 1.** This exam's contribution to your final grade is 50%.
- 2.** There are six questions in this exam. You should answer all of these questions.
- 3.** You may use a calculator which does not have smart phone functionalities.
- 4.** Mobile phones and laptop computers should be turned off.
- 5.** You are not allowed to leave the room for the first 20 minutes of the exam time.
- 6.** This is a closed-books and closed-notes exam.
- 7.** You are not allowed to talk to each other during the exam.
- 8.** *Student Discipline Regulations of the Institutions of Higher Education* are in effect. According to the 9th article, cheating in this exam may have severe consequences for you—including a temporary suspension of your studies up to two semesters.
- 9.** You have exactly 75 minutes to complete the exam.

Questions

1. [1 point] Consider an individual with a nominal wage of $W > 0$ and a nominal non-wage income of $R > 0$. Suppose that this individual consumes two goods—milk and sugar. Let $P_m > 0$ and $P_s > 0$ respectively denote the unit prices of milk and sugar. Also suppose that the individual cannot borrow. Write down the budget constraint the individual faces.

Answer

2. [7 points] Solve the following optimization problem: $\max_{x \geq 0} -(x^2 - 9)$

Answer $x^* =$

3. [2 points] Imagine a market where the quantity supplied is equal to 100 units. Let the demand function be in the form of $Q^d \equiv 127 - P^3$. What is the equilibrium price level?

Answer $P^* =$

4. [15 points] A perfectly-competitive firm uses capital—denoted by $k \geq 0$ —to produce a commodity. The production function is defined as in $y \equiv \sqrt{k}$. Let the unit price of capital be 3, and denote the profit-maximizing level of output by y^* . What is $\partial y^* / \partial p$ equal to where $p > 0$ is the market price of the commodity?

Answer $\frac{\partial y^*}{\partial p} =$

5. [20 points] An individual consumes two goods— x and y . The utility derived from the consumption of these goods reads $U(x, y) \equiv 1 + xy - 2y$ where

$$U(x, y) : (3, +\infty) \times \mathbb{R}_+ \rightarrow \mathbb{R}.$$

Let the budget constraint be $2x + 4y \leq 12$. Solve the individual's utility maximization problem.

Answer $x^* =$ $y^* =$

6. [5 points] Write down a strictly increasing and a strictly convex cost function as a function of the volume of output.

Answer $C(y) =$