Follow all instructions carefully. There are 3 sections to the exam. Think before writing; be brief and concise. Excess verbiage will not be rewarded. Some questions are harder than others. If a question seems too hard, move on to another one and then return to the harder questions later. Do not panic, the exam will be curved.

There are seventy points on the exam, so you should take about one minute per point, leaving a few minutes to read instructions and proofread your answers.

Unless indicated otherwise, all questions refer to perfectly competitive markets and all changes are short-run. You should explain each answer clearly and concisely.

On each bluebook you use, write your name, your TAs name and the exam section number.

NO SECTIONS THIS WEEK!

Answer Section I one on the next page, NOT IN A BLUE BOOK.
This exam was taken in (circle one): Regular Lecture Hall (SSS) / Street Hall (one extra point if you’re in the right place!)

**Section I:** Short Definitions. 12 points total (2 points each). Define the following words in one or two sentences each. Answer this section on this sheet and turn it in with your bluebooks. Think before writing!

1. Opportunity Cost

2. Marginal Utility

3. Comparative Advantage

4. Fixed Cost

5. Production Possibilities Frontier

6. Iso-quant
Section II. Answer this section in a separate blue book labeled “Part II”. Write your name and your teaching fellow’s name on the bluebook. Be sure to explain each answer, clearly and briefly.

This section has 36 points total.

1. (12 points total) Consider the market for milk in the Northeastern U.S.
   (a) (2 points) Draw a supply and demand diagram indicating the equilibrium price and quantity of milk.
   (b) (2 points) Show what happens if the price of transporting milk to market goes down.
   (c) (2 points) How would your answer change if the demand for milk were less elastic?
   (d) (3 points) The government has established a minimum price for milk that is above the market price. Show the effects of this policy on the quantity of milk consumed.
   (e) (3 points) Show the change in total social surplus that results from the imposition of the minimum price.

2. (12 points total) Consider the perfectly competitive firm that uses labor, $L$, and capital, $K$, to produce an output.
   (a) (4 points) Use a diagram to describe the input choices of the firm. Label this diagram carefully.
   (b) (2 points) Describe how the cost function is derived from these input choices.
   (c) (3 points) Given the cost function, describe the optimal output choice of the firm.
   (d) (3 points) Graph the profits of the firm at the output described in part (c).

3. (12 points total) Cathy consumes diet coke and popcorn.
   (a) (4 points) Use a graph to show Cathy’s optimal consumption.
   (b) (3 points) Assume the goods are complements. Show what happens if the price of diet coke increases.
   (c) (5 points) Decompose the effect of the price change into substitution and income effects.

Section III. Answer this section in a separate blue book labeled “Part III”. Write your name and your teaching fellow’s name on the bluebook. Be sure to explain each answer, clearly and briefly.

This section has 22 points total.

1. (10 points). David is a student who wants to allocate his income across two periods. Today, he earns no income, but in “period 2” he will be working and will earn income $Y$. David can borrow from the future at an interest rate of $r$.

   (a) (3 points) What is the present value of David’s income flow over the two periods?
   (b) (3 points) What is the present value of David’s consumption flow? What therefore is his two-period budget constraint?
   (c) (4 points) Draw an indifference curve diagram illustrating how much David borrows when he is a student.

2. (12 points total) Johnny and Jamie eat Peanut Butter and Tuna Fish. They have diminishing marginal rates of substitution for the goods.

   (a) (2 points) Given an arbitrary initial allocation of the two goods to Johnny and Jamie, can a voluntary trade make both of them better off?
   (b) (5 points) What is the condition on marginal utilities that will make both of them better off if Johnny gives Jamie Peanut Butter and receives Tuna Fish in return?
   (c) (5 points) Now assume that Johnny and Jamie have purchased their sandwiches in a competitive market. Is there a trade that can make both of them better off? Why or why not?