

Write all answers on your exam. **Show all of your work.** The exam ends at 12:00.

1. (a) (10pts) Suppose the price of corn is \$1/lb and the price of wool is \$2/lb. Sandy, who is a hypothetical consumer of corn and wool, has an income of \$10. In the space below, draw a graph of Sandy's budget line, putting corn on the horizontal axis and wool on the vertical axis. Label the axes, and label with their numerical values the intercepts of her budget line.

What is the slope of Sandy's budget line?

(b) (5pts) Suppose that, with all else unchanged, the price of corn goes up to \$2/lb. On the graph from part (a), draw Sandy's new budget line. Label with their numerical values the intercepts of her new budget line. What is the slope of Sandy's new budget line?

(c) (5pts) To your graph from parts (a) and (b), add a set of indifference curves for Sandy.

(d) (5pts) On your graph, indicate Sandy's utility-maximizing quantity of corn when the price of corn is \$1/lb, labeling that quantity Q_1 . Indicate Sandy's utility-maximizing quantity of corn when the price of corn is \$2/lb, labeling that quantity Q_2 .

2. Consider a hypothetical firm, called Firm A. Suppose that in the short run, Firm A has 12 units of its fixed input, capital. As the firm adds its variable input, labor, to that fixed quantity of capital, it can produce the following output in a day.

Firm A's Production

Units of Capital	Hours of Labor	Units of Output
12	0	0
12	1	3
12	2	7
12	3	9
12	4	10
12	5	10

(a) (5pts) At what point do diminishing marginal returns to labor set in for Firm A?

Suppose that the 12 units of capital cost a total of \$40 per day, regardless of how much output Firm A produces. Suppose each hour of labor costs \$10.

(b) (10pts) On the grid below, graph Firm A's daily total cost of production. Label your axes, and label each tick mark with its numerical value.

Firm A's Total Cost

3. (a) (15pts) Consider a hypothetical firm, called Firm B. Draw a graph below of Firm B's short run cost curves. Your graph should include the marginal cost curve (labeled MC), the average variable cost curve (labeled AVC) and the average total cost curve (labeled ATC) for this firm. Your graph should show that diminishing marginal returns to labor do set it. As with every graph, be sure to label your axes.

(b) (5pts) On your graph of the Firm B's short run costs, mark with an "a" the point at which diminishing marginal returns to labor set in.

Suppose Firm B operates in a perfectly competitive industry, and that all firms in this industry have the same costs of production.

(c) (10pts) Indicate on your graph Firm B's short run supply curve.

(d) (5pts) Indicate on your graph the long run equilibrium price.

As you answer Question 4, consider the following information, and assume Canada is open to international trade and is small relative to the world as a whole. Assume that the market for oil is perfectly competitive.

“Energy Independence Wouldn’t Make Gasoline Any Cheaper”

by David Kestenbaum

National Public Radio, October 26, 2012

Just about every president since Richard Nixon has set energy independence as a goal, and both major candidates have brought it up the current campaign.

As it turns out, there is a place, not so far from here, that has achieved energy independence: Canada. Canada produces far more oil than it consumes.... [but] energy independence does not mean cheaper gasoline. It

doesn't even mean that prices are more stable. Gas prices in Canada went up this summer just like they did in the United States. Prices in Canada are sensitive to conflict in the Middle East, or increased demand from China. There is a global market for oil. That means there is basically one price, whether you are a net exporter (Canada) or the world's biggest importer (the U.S.).

Read parts 4(a) – (c) before you answer any of them.

4.(a) (10pts) On the next page, draw a pair of graphs, side by side. Use the graph on the left to show the domestic supply and domestic demand for oil in Canada. Use the graph on the right to show the world supply and world demand for oil. Label your axes. On your graph of Canadian domestic supply and demand, indicate the price of oil in Canada, the amount of oil that Canada produces (labeling it $Q_{S \text{ domestic}}$), the amount of oil that Canada consumes (labeling it $Q_{D \text{ domestic}}$), and the amount of oil that Canada exports.

(b) (5pts) Now suppose that an increase in Chinese incomes raises Chinese demand for oil, thereby increasing world demand for oil. Show the effect on your graphs from part (a). Add the new world oil demand curve (labeling it D') and show the new world price of oil (labeling it P_W'). Label the amount of oil Canada now produces $Q_{S \text{ domestic}}$ and the amount of oil that Canada now consumes $Q_{D \text{ domestic}}$. On your graphs, indicate the amount of oil that Canada now exports.

(c) (5pts) On your graph, indicate how consumer surplus in the Canadian oil market changed due to the increase in Chinese demand for oil.

5. (a) (2pts) Define diseconomies of scale.

(b) (3pts) Define economic profit. Explain how economic profit is different than accounting profit.