# ECON 360: Intermediate Microeconomics

Summer 2025 Final Exam

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- Define any variables you need to answer the problems.
- All materials except for your cheat sheet should be put away before beginning the exam. Use of cell phones during the exam for any purpose is forbidden.
- Please write your answers in the space provided.
- Keep your answers short but clear. Your goal is to convince a skeptical grader that you understand the relevant concepts well enough to answer the question you are given.
- The questions on the exam sum to 71 points. Your cheat sheet is worth up to 7 points, for a total possible points of 78 on this exam.
- Remember to turn in your cheat sheet with your exam.
- Good luck on your Econ test!

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1. (2 points) What is your name?

# 1 True/False Questions

Indicate "T"rue or "F"alse for each of the following statements or claims. For each false statement, if you explain why it is false I will give you a bonus point.

2. (2 points) Claudette the researcher uses two inputs, $L$iterature and $A$nalyses, in order to produce/write economic research papers $P$. As Claudette uses more and more Literature, the number of papers she is able to write when she reads 1 additional Literature continues to increase, holding constant the number of Analyses. When Claudette uses more and more Analyses, the number of papers she is able to write when she increases her Analyses by 1 increases but at a decreasing rate, holding constant the number of Literature. **Claim**: If Claudette's production function of Literature and Analyses could be represented as a Cobb-Douglas production function, the production function would exhibit decreasing returns to scale.

3. (2 points) A firm produces widgets($Y$) using labor($L$) and capital($K$) according to the production function $Y = \max\{4L, 2K\}$. The price of labor is \$10, and the price of capital is \$40. **Claim**: Profit maximization will not yield a single optimal amount of $Y, K, L$ for this firm, but cost minimization would say that this firm should hire $\frac{Y}{4}$ units of Labor for any amount of $Y$ they want to produce.

4. (2 points) Erin's guitar shop produces $q$ guitars at a total cost of $TC(q) = 32q - \frac{10}{q}$. **Claim**: This cost function represents a long-run cost function.

5. (2 points) Suppose the government is deciding whether to implement a tax of \$1 or \$2 in a perfectly competitive market with unit elastic demand and supply curves. **Claim**: The deadweight loss resulting from the \$2 tax would be twice as much as the deadweight loss from the \$1 tax.

6. (2 points) Ana runs a lemonade stand selling cups of lemonade. Ana had to pay her friend $10 for a table and chair to run her lemonade stand, regardless of how much lemonade she sells. Her cost to produce 1 extra cup of lemonade is $0.50. She is the only lemonade stand on the block, and finds the profit maximizing price to charge is $2.00. Even though she is the only stand on the market, she is not able to stop anyone else from opening a lemonade stand in her neighborhood, and assume $10 is a low cost of entry. Also assume any entrant's lemonade will be indistinguishable from Ana's lemonade **Claim**: In the long run, based on what we have learned in class, Ana will continue to be the only lemonade stand in the neighborhood.

# 2 Multiple Choice Questions

Circle the best answer to each question. There is only one answer for each question. No explanation necessary.

7. (2 points) Suppose a firm produces $q$ units of output using labor ($L$) and capital ($K$) according to the production function $Q = K^2 + L^3$. When the firm uses the input bundle (L=3, K=2) what is the firm's technical rate of substitution for capital and labor?

    A. 1 unit of capital for 1 unit of labor.

    B. 3 units of capital for 2 units of labor.

    C. 2 units of capital for 3 units of labor.

    D. 4 units of capital for 27 units of labor.

8. (2 points) The demand curve for a particular good is given as $P = Q^D - 10$ and the Engel curve (showing the relationship between quantity demanded and income $w$) is given by $Q^D = 4 - w$. Which of the following best describe the characteristics of this good based on the demand and Engel curves?

    A. Ordinary and normal.

    B. Ordinary and inferior.

    C. Giffen and normal.

    D. Giffen and inferior.

9. (2 points) DJ Khalid has come up with a brand new formula for dish soap, unlike anything that exists on the market, and so DJ Khalid is the only seller of this new, better soap. Currently, DJ Khalid sells the soap for $5 a bottle, and sells 10 bottles of soap. In order to sell 11th bottle of soap, Dawn must drop the price to $4.80. What is DJ Khalid's marginal revenue for selling the 11th bottle of soap.

    A. $52.80

    B. $2.80

    C. $4.80

    D. $48.00

10. (2 points) Suppose coffee is a normal and ordinary good for people in Binghamton, and the marginal cost of coffee increases at a constant rate for suppliers, of which there are many who sell identical coffee. Suppose there are two simultaneous shocks in the Binghamton coffee market. 1) The people in Binghamton receive a raise in their disposable incomes. 2) Tariffs make the marginal cost of coffee more expensive for all coffee producers. Using a supply and demand diagram, which best describes how the equilibrium price and quantity in the coffee market will change after the two simultaneous shocks?

    A. Price will increase, impact on quantity is unclear.

    B. Price will decrease, impact on quantity is unclear.

    C. Quantity will increase, impact on price is unclear.

    D. Quantity will decrease, impact on price is unclear.

11. (2 points) You run a local college town establishment, and can produce a quantity of pounds of food $F$ according to the total cost function $TC(F) = 20q + \frac{1}{2}q^2$. What is your marginal cost to produce the 10th pound of food?

    A. \$250.

    B. \$30.

    C. \$25.

    D. \$0.

# 3 Short Answer Questions

These questions all require an explanation. Remember you are trying to convince me you understand the why and the how of what you are doing, not simply getting the answer correct. Cite specific concepts from class in your answers for full credit.

12. Consider the market for sunglasses. The market demand for sunglasses is given by the equation $P = 120 - 10Q^D$ and the market supply of sunglasses is given by the equation $P = 10Q^S$.

    (a) (8 points) Graph the market for sunglasses with $Q$ on the x-axis and $P$ on the y-axis. Label the axes, the demand curve, and the supply curve. Graphically find the equilibrium quantity and equilibrium price in this market if the sunglasses market were perfectly competitive.

(b) (10 points) Algebraically determine the equilibrium price and quantity. Then, calculate the producer, consumer, and total surplus in the sunglass market. Show your work.

(c) (8 points) Suppose instead of being perfectly competitive the sunglasses market was a monopoly market with a marginal cost curve equal to the supply curve from part a. Derive the marginal revenue equation and find the monopoly's profit-maximizing price and quantity. Show your work.

(d) (4 points) What is the maximum a perfectly competitive firm would be willing to pay in order to become a monopoly in the sunglassess market? Assume the firm's total cost is given by $TC(Q) = 5Q^2 + 20$. Show the steps you take to arrive at your answer. A graph may be helpful (but is not required)!

13. Let's revisit the farmstand example from class, and let's say we are at the New York State Fair and we want to figure out/estimate how many farmers there are in New York State. Suppose Bill the farmer produces a number of dozens of eggs $q$ (little q) according to the total cost function $TC(q) = 100 + 4q + q^2$. The egg market is perfectly competitive and we are assuming the farmers only produce dozens of eggs.

    (a) (3 points) From Bill's total cost function, show the steps you take to find the following cost functions. No explanation needed.

    - Average variable cost.
    - Average total cost.
    - Marginal cost.

(b) (6 points) Suppose the equilibrium price in the egg market is $10 per dozen eggs. Would Bill produce or shutdown in the short run? Would Bill remain in the market or exit in the long run? Explain using intuition and math.

(c) (10 points) Now suppose the market demand for dozens of eggs at the New York State Fair is given by $P(Q) = 45 - 0.002Q^D$, or $P(Q) = 45 - \frac{2}{1000}Q^D$, and all egg farmers have the same cost structure as Bill. Find the long-run equilibrium number of farmers in the market.