2. (71 points) A monopoly book publisher with a constant marginal cost of $MC = \$5$ faces a linear demand function of $Q_A = 55 - P_A$ from consumer A and $Q_B = 70 - 2P_B$ from consumer B.

(a) (15 points) If no price discrimination is possible, what is the optimal uniform pricing assuming that it is low enough that both consumers buy the book? How many books will be sold to each consumer? Given fixed costs are F, how much profit does the monopolist make?

(b) (7 points) Calculate the Lerner Index and price elasticity of demand for the uniform pricing monopolist.

(c) (12 points) If price discrimination between the two consumers is possible, what is the optimal pricing for each consumer? How many books will be sold to each consumer? Given fixed costs are F, how much profit does the monopolist make?

(d) (12 points) If the monopolist can adopts a two-part pricing policy that is the same for two consumers, what will be the fixed fee and what will be the price per book?

Suppose the monopolist cannot distinguish between the regions and relies on buyers to reveal their willingness to pay.

(e) (15 points) What is the optimal menu pricing?

Observing the profits earned by the firm, another firm enters the market. The two firms engage in Bertrand competition.

(f) (10 points) What is the equilibrium price set by each firm for each customer? What are the total profits in this situation?

3. (14 points) The production function at Ginko's Copy Shop is

$$Q = 1000 \times \min\{L, 3K\}$$

(a) (5 points) What is the long-run total cost function $TC(Q)$ for this production function?

(b) (5 points) Calculate the long-run average cost function and use it to describe the nature of this function's scale economies. Over what range of output does economies of scale exist? Diseconomies of scale?

(c) (4 points) Identify the minimum efficient scale for this firm.

4. (14 points) Tim has the following utility function: $U(x, y) = \min\{10x, 5y\}$. Let Tim's income be $I = \$300$, $p_x = \$1$ be the price of x, and $p_y = \$1$ be the price of y.

(a) (6 points) Find Tim's demand functions $x^*(p_x, p_y, I)$ and $y^*(p_x, p_y, I)$. How much will Tim consume given the prices and income that he has?

(b) (8 points) Suppose now that the price of x increases to $p_x = \$4$ and the price of y stays the same. How much of x and y will Tim consume now? How much of the change in consumption of x is due to income effect and how much of it is due to substitution effect? Show your calculations and illustrate the change of a carefully drawn and labeled graph.