You must answer all of the following questions. Each question is worth the same amount. You have the class period to complete the exam.

Answer each question clearly and concisely. You must show your work to receive credit.

This exam is given under the rules of the Montana State University. By printing your name above you acknowledge the University’s Honor Code and agree to comply with the provisions of the Honor Code. You may not use notes or receive any assistance. There is to be no talking during the exam. You may use a calculator, but are never allowed to use device allowing you to take photographs or transmit over a network. **No notes, no assistance, no talking, no cell phones, but you can use a calculator.**

Clearly print your name above, in the space provided on the next page and in your blue book(s). You must turn in your blue book(s).
1. Consider the strategic form game of Figure 1. The payoffs are listed as the (payoff to the player on the left, payoff to the player on top).
   (a) Derive the best response functions.
   (b) Are there any dominant strategies?
   (c) Are there any dominated strategies?
   (d) Use the method of iterated elimination to try and find the outcome of the game.

2. The inverse demand function is $P = 125 - 4Q$. There are two firms which compete in prices and have constant marginal costs of 29. Each firm has a production capacity of $x$. If both firms charge the same price, assume they both split the market evenly.
   (a) Assuming Firm $B$ produces at their capacity, $q_b = x$, find Firm $A$’s residual demand and marginal revenue.
   (b) If the capacity constraint for each firm, $x$ is such that $x \leq 8$, what are the equilibrium prices and quantities. (Be sure to justify and show your work.)
   (c) If the capacity constraint for each firm, $x$ is such that $x \geq 24$, what are the equilibrium prices and quantities. (Be sure to justify and show your work.)
   (d) If the capacity constraint for each firm, $x$ is such that $8 < x < 24$, what are the equilibrium prices and quantities. (Be sure to justify and show your work.)
3. Market demand is \( p = 100 - Q \) and there is a monopolist with a constant marginal cost of zero. Another firm is considering entering the market, and if they enter both firms compete in quantities. The potential entrant has a constant marginal cost of \( c \).

(a) What is the equilibrium price, quantity and profits for the monopolist? (Disregard the potential entrant for now.)

(b) What is the lowest value of \( c \) such that the potential entrant does not affect the monopolist?

(c) If entry occurs what is the profit of the firm with marginal costs of zero?

(d) If \( c = 20 \) does the monopolist want to try to prevent the other firm from entering?

4. Market demand is \( p = 50 - Q \). There are \( N \) firms that compete in quantities. Each firm has a cost of \( C(q_i) = cq_i \) where \( c > 0 \).

(a) What is the best response function for a firm?

(b) Find the equilibrium quantity of a firm, market quantity and price. (These will all be functions of \( N \) and \( c \).)

(c) Show that an increase in \( c \) causes the price to increase and the market quantity to decrease.

(d) For an increase in \( c \) if the change in the price larger or smaller than the change in the market quantity?

(e) Determine deadweight loss as a function of \( c \) and \( N \) and is deadweight loss increasing or decreasing as \( c \) increases?