1. (25%) Let the demand and cost functions of a monopolist be $p = 100 - 3q + 4\sqrt{A}$

    and $C = 4q^2 + 10q + A$ where A is the level of her advertising expenditure. Please find the values of A, q, and p that maximize profit.

2. (25%) Rose consumes two goods, x and y. Her utility function is $U(x, y) = xy^2$. Good x costs $2 a unit and good y costs $1 a unit.

    (1) If her income is m, what is her demand for x and y? (6%)

    (2) If she has no money income but is endowed with 3 units of x and 6 units of y, how many units of x and y will she demand? (6%)

    Suppose that the price of x now changes to $1 per unit, and Rose is still endowed with 3 units of x and 6 units of y:

    (3) Without calculating the exact demand, is Rose better off or worse off from that price change? Calculate her utility before and after the price change to confirm your answer. (6%)

    Suppose Rose now has no endowment but $12.

    (4) What is her demand of x when $p_y = 2$? What is her demand of x when $p_y = 1$? How much of that demand change in x is due to the substitution effect? (7%)

3. (25%) Consider a very simplified model to understand why Bank Runs might happen. A Bank run is a situation where a bank collapses as a lot of its customers demand for all of their cash in a very short time period. A bank has two clients, Warren and Diana. If anybody "runs" to the bank today then they get to split $8M equally with the other person, if the other person also chose to "run" to the bank today. If the other person chooses not to run to the bank, then the person who "ran" to the bank gets to pocket $8M. Even if one person runs to the bank, then the bank collapses and does not exist from today on. If it does not collapse today it would continue to exist a year from now.

    The other option each of the clients has is to not run. If (s)he chooses not to run, his/her payoff is $10M a year from now, if the bank exists at that time and obviously, $0, if the bank has ceased to exist. (Assume that for each of them value of money tomorrow is just the same as the value of money today. There is no discounting.)

    (1) Write the pay off matrix for Warren and Diana with the two strategies being (Run, Not run). (6%)

    (2) Find all the pure strategy equilibria of this game. (6%)

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(3) Is there a dominant strategy for any of the players? Does this game have a mixed strategy equilibrium? Explain. (7%)

(4) Using this very simplified setup argue why Bank runs might happen as the fear about the health of financial system increase at the times of crisis. (6%)

4. (25%) Suppose that South Molucca is willing to supply any number of baskets to Americans at a price of P_0. American basket manufacturers have an upward-sloping supply curve that intersects demand at a price above P_0.

(1) Explain why the market price for basket is P_0. Show how many baskets Americans buy at this price. Show how many are provided domestically and how many are imported from South Molucca.

(2) Show the welfare gain to Americans from the existence of the basket market, and show how it is distributed between consumers and producers. (6%)

(3) Now suppose that a quota is enacted that permits the South Molucca to sell only Q_0 baskets per year in America, and that Q_0 is less than the quantity they have been selling to us up until now. Show that there is only one price consistent with Americans wanting to import exactly Q_0 baskets, and explain why the price of baskets will rise to that level. (6%)

(4) Show the new gains to American producers and consumers. Who wins and who loses as a result of the quota? Which is greater—the amount the winners win or the amount the losers lose? Show on your graph the difference between these two quantities. (7%)