1. Rose, who is currently earning an income of $47,000, is considering quitting her job and opening her own restaurant. To do so, she will have to cash in her life savings of $200,000, which have been in a certificate of deposit paying 6% per year. She will need this $200,000 to purchase equipment for her restaurant operations. She estimates that she will have to spend $4000 during the year to maintain the equipment so as to preserve its market value at $200,000. Fortunately, she owns a building suitable for the restaurant. She currently rents out this building on a month-by-month basis for $2500 per month. She anticipates that she will spend $50,000 for food, $40,000 for extra help, and $14,000 for utilities and supplies during the first year of operations. There are no other costs involved in this business. To keep things simple, suppose that Rose lives in Bushtopia, a country without any taxation whatsoever. What are the economic costs of operating the restaurant during the first year? In other words, what level of revenues will Rose need to achieve in the first year to make the first year profitable in an economic sense?

2. Jack and Jill own a large confection plant that specializes in the production of 2 oz. vintage style pails that are made out of 72% cocoa dark chocolate and are filled with a soft center of mocha mousse (they produce no other products). The shop’s weekly overhead cost, that includes rent, local taxes and preventive maintenance, is $36,000. The marginal cost of producing a pail is constant at $1.20, up to the maximum capacity of 100,000 chocolate pails a week. The demand for pails comes from about 50,000 potential Bay area customers, each of whom has the following demand curve (per week):

\[ q^d(P) = 6 - 2P \]  \hspace{1cm} (1)

where \( p \) is the per-unit price. Assume that Jack and Jill can only use simple pricing (aka uniform per-unit pricing).

(a) What is the profit-maximizing price for the bakery to charge? How many chocolate pails does it sell at that price (abstract from the fact that people buy an integer amount of chocolate pails)? What are its maximized profits?

(b) Following the weakness in the housing market, Jack and Jill negotiated a lower rent with their landlord which reduced overhead by $3,000 per week. How are the optimal price and profits affected by this change (compared to part (a) of this question)?
(c) Due to an accidental fire, 25% of the plant's production capacity has been destroyed, and city regulations prevent Jack and Jill from reconstructing their plant. This has not affected the marginal cost of production or the plant's overhead, but reduced capacity to 75,000 chocolate pails a week. How are the optimal price and profits affected by this change (compared to part (a) of this question)?

(d) An increase in the price of cocoa increases the marginal cost by $0.30. How are the optimal price and profits affected by this change (compared to part (a) of this question)?

3. A bakery in a remote town faces essentially no competition. The weekly demand for its famous morning buns is given by \( q_d(p) = 800 - 200p \), where \( p \) is the price per bun. Currently, the bakery is charging $2.55 per bun. Assume that is the profit-maximizing price. Half of the bakery's marginal cost comes from is the wholesale price it pays for flour. Due to recent events in the wheat market, the wholesale price of flour rises by 11%.

(a) What is the new profit-maximizing price for morning buns?

(b) By how much does the bakery's profit per week rise or fall?

(c) What does your analysis suggest about the validity of supposition that retailers get rich when they raise their prices? (For example, bakeries when the price of flour rises)?

4. Ann & Bob's bakery produces very special cookies (and no other products). The bakery's weekly overhead cost is $24,000. The marginal cost of producing one more cookie is constant at $0.80, up to the maximum capacity of 45,000 cookies a week. The demand for cookies comes from 10,000 potential customers, each of whom has the following demand curve (per week): \( q_d(p) = 4 - p/4 \) where \( p \) is the per-unit price. Assume that Ann & Bob's can only do simple pricing (aka a single per-unit price for all units).

(a) What is the profit-maximizing price the bakery should charge? How many cookies are sold at that price? What are its profits?

(b) An increase in rent increases Ann & Bob's overhead by $2,000 per week. How are the optimal price and profits affected by this change (compared to part a.)?

(c) An increase in the price of cardamon increases the marginal cost by $0.10. How are the optimal price and profits affected by this change (compared to part a.)?
5. A gas station in a more rural part of the state faces essentially no competition. Its weekly demand is given by \( q(p) = 82,500 - 30,000p \), where \( p \) is the price per gallon that it charges. Currently, the gas station is charging $2.63 per gallon. Assume that is the profit-maximizing price. For all extents and purposes, the gas station’s marginal cost of selling a gallon of gasoline is the wholesale price it pays per gallon. Suppose, due to recent events, the wholesale price of gasoline rises by 5%.

(a) What is the new profit-maximizing price for the gas station to charge its customers?

(b) By how much does the gas station’s profit per week rise or fall?

(c) What does your analysis suggest about the validity of allegations that gas stations get rich when the price of oil rises?

6. You are asked to help with the pricing at a golf course. The course has 10,000 customers, each with an individual monthly demand curve for games played \( q(P) = 10 - P \). The marginal cost for a game played is $2, and monthly overhead costs are $150,000. The course has enough capacity to serve all potential customers without overcrowding the course. Assume that the fixed cost for serving each customer (such as the cost of printing a membership card) is negligible, so that all variable costs are due to games played.

1. (a) The owner of the course is an old-fashioned businessperson and insists on a simple pricing strategy, i.e., a fixed price per game played. Your job is just to figure out the optimal price. What price would you set, and what would be the monthly profits?

(b) Emboldened by your success in part a), you decide to show the owner that the course would be better off by implementing a membership fee and a price per game. What would be the optimal prices, and what would be the monthly profits? Also, try to briefly explain to the owner the intuition of why this works better than simple pricing.