

Homework #3 (Due on November 17th, 2026)

1. Exercise 2 from Chapter 7 in Shy (page 165)
2. Pullman and Moscow are very similar cities, because each city has exactly one McDonald's. Pullman has $N_P = 120$ residents and Moscow has $N_M = 120$ residents. Each demands one hamburger. A resident of Pullman who wishes to buy a hamburger in Moscow must bear a transportation cost of $T_P = \$1$. Similarly, a resident of Moscow who wishes to buy a hamburger in Pullman must bear a transportation cost of $T_M = \$2$. Suppose that McDonald's has the technology of producing hamburgers at no cost. Answer the following questions.
 - a. Suppose that the Moscow store charges p_M for a hamburger. Derive the demand function facing the Moscow store as a function of its price, p_P . Hint: See equation (7.35) on p.159.
 - b. Suppose that the Pullman store charges p_P for a hamburger. Derive the demand function facing the Moscow store as a function of its price, p_M .
 - c. Suppose that the Moscow store charges p_M . Compute the profit of the Pullman store when this store undercuts the price set by the Moscow (so that all consumers in the area purchase from the Pullman Store).
 - d. Suppose that the Pullman store charges p_P . Compute the profit of the Moscow store when this store undercuts the price set by the Pullman (so that all consumers in the area purchase from the Moscow Store).
 - e. Compute the Undercut-proof equilibrium prices p_P and p_M . Explain why in equilibrium store Pullman charges lower price than store Moscow.
 - f. Compute the equilibrium profit levels π_P and π_M .
3. On an atoll in the Pacific island group Saloponesia there is just one street, Ring Street, along which all people live—one islander per unit distance—and along which all shops are located. The island group used to be a French colony, which may explain the islanders' custom of walking to a nearby bakery every day to buy a fresh chocolate croissant. Their attachment to this custom is not unbounded, however. Depending upon the opportunity cost of their time spent walking, they may find croissants too expensive. In that

case they stay home and eat corn flakes instead. Each of the bakers runs exactly one bakery and, when not baking, plays Bertrand.

- a. Set up a model (adopting simplifying assumptions where appropriate) to analyze this croissant market, and describe the equilibrium if it is given that there are some islanders who eat corn flakes.
4. The diaper industry is characterized by 8 firms producing identical diapers. Let s_i denote the percentage market share of firm i , $i = 1, 2, \dots, 8$. It has been recently observed that the market shares are given by

Firm i	1	2	3	4	5	6	7	8
s_i	60%	10%	5%	5%	5%	5%	5%	5%

- a. Compute the concentration measures I_4 and I_{HH} for this industry.
 - b. Suppose now firm 2 and firm 3 merge and become a single firm labeled firm 23. Compute the post-merger concentration measures values $\hat{I}_4$ and $\hat{I}_{HH}$.
 - c. Compute the change in concentration resulting from this merger, $\Delta I_4 \stackrel{\text{def}}{=} \hat{I}_4 - I_4$ and $\Delta I_{HH} \stackrel{\text{def}}{=} \hat{I}_{HH} - I_{HH}$
5. Exercise 2 and 3 from Chapter 8 in Shy (pages 213-214)