

5. Promoters of a major college basketball tournament estimate that the demand for tickets on the part of adults is given by $Q_{ad} = 5,000 - 10P$, and that the demand for tickets on the part of students is given by $Q_{st} = 10,000 - 100P$. The promoters wish to segment the market and charge adults and students different prices. They estimate that the marginal and average total cost of seating an additional spectator is constant at \$10.
- For each segment (adults and students), find the inverse demand and marginal revenue functions.
 - Equate marginal revenue and marginal cost.
 - Plug the quantities you found in (b) into the respective inverse demand curves to find the profit-maximizing price for each segment. Who pays more, adults or students?
 - Determine the profit generated by each segment, and add them together to find the promoter's total profit.
 - How would your answers change if the arena where the event was to take place had only 5,000 seats?
 - Calculate each segment's marginal revenue function using calculus and confirm that your answers are the same as those solved algebraically in part (a).
 - Supposing that there are no fixed costs, determine the profit-maximizing quantity for each market segment using calculus and confirm that your answers are the same as those solved algebraically in part (b).
 - If the promoters of the major college basketball tournament in this problem can perfectly price-discriminate in the adult segment of the market, what is the optimal output level? Identify consumer surplus, producer surplus, and the deadweight loss from this market power using calculus.
 - If the promoters can perfectly price-discriminate in the student segment of the market, what is the optimal output level? Identify consumer surplus, producer surplus, and the deadweight loss from this market power using calculus, and compare these surplus values to those in part (h).