



Instructions: Open book, open notes, no collaboration.  
Partial credit will be assigned. Please show your work.  
You may take this test during any consecutive 4 hour period.

**Due February 7, by 5:00 PM.** Please deposit in Box outside Baxter 100.

- The demand for hamburgers has a constant elasticity of 1 of the form  $x(p) = 8,000 p^{-1}$ . Each entrant in this competitive industry has a fixed cost of \$2,000 and produces  $\sqrt{x}$  hamburgers per year, where  $x$  is the amount of meat in pounds.
  - If the price of meat is \$2/lbs, what is the long run supply of hamburgers?
  - Compute the equilibrium number of firms, quantity supplied by each firm and the market price of hamburgers.
  - Find the short run industry supply, does it have constant elasticity?
- A recent college graduate wants to retire 30 years from today, and would like to spend \$20,000 during the first year of his retirement, in today's terms. Suppose his annual retirement expenditure increases 3% every year. If he lives forever, how much should he save each year leading up to his retirement? Assume a 5% return on investments.
- A toy factory costs \$2 million to construct and the marginal cost of the  $q^{\text{th}}$  toy is  $\text{Max}[10, q^2/1,000]$ .
  - What are average total costs?
  - What is short run supply?
  - What is the long run competitive supply of toys?
- Give a brief summary of Ricardian theory. If it holds true, what kinds of goods should the US export and what should it import? How well does the theory hold up?
- A company that produces software needs two inputs, programmers ( $x$ ) at a rate of  $p$  and computers ( $y$ ) at a price of  $r$ . The output is given by  $T = 4 x^{1/3} y^{1/3}$ , measured in pages of code.
  - What is marginal cost?
  - Now suppose each programmer needs two computers to do his job, what ratio of  $p$  and  $r$  would make this input mix optimal?
- Suppose the price of Microsoft's operating system increases. Explain how this might affect the price and quantity of Intel microprocessor chips.