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Exercise 0

Consider a monopolist who controls a stockpile, S, of a particular resource. Suppose this monopolist is interested in maximizing the present value of profits over two periods, this year and next year, and is not concerned about what happens after that. In each period the amount consumers are willing to pay for q_i units of the good is given by the inverse demand equation $p_i = Aq_i^{-\eta}$, where A and η are parameters and η is strictly less than 1. The monopolist computes the present value of next year's profits using a discount factor of e^{-r}.

Assuming the good is costless to store (and costless to extract from the stockpile), set up and solve the monopolist's maximization problem. Will the monopolist exhaust the stockpile? How will quantities change as the interest rate changes? How will the prices in the two periods be related? Why is it important that η be less than one?