1. (two points) Problem 10 (page 221). Show on the graph and explain.

2. (four points) Suppose the production function is given by \( q = f(K,L) = K + L \).
   (a) Assume that the \( w \) (wage rate – price of labor) is equal to the \( r \) (rental rate – price of capital). What is the optimal bundle of inputs necessary to produce output \( q \) in the long run? What is the long run cost function \( TC(q) \)? Hint: The solution to this cost minimization problem can be found similarly to the Solved Problem 4.3 on the page 95 in the book.
   (b) What would happen to the cost function if wage rate \( w \) went up and the rental rate \( r \) stayed the same? Hint: Is the optimal inputs bundle going to change with these new prices \( w > r \)? If so, is the cost of this new bundle going to be different from the original optimal bundle?

3. (two points) Consider a cattle farmer in Iowa who produces beef and hides. The cost function is given by \( C(q_1, q_2) = q_1^2 + 2q_2^2 – 0.05q_1q_2 \), where \( q_1 \) is the output of beef (in thousands of pounds), \( q_2 \) is the output of hides (in hundreds). Does this production process exhibit the economies of scope?

4. (two points) Consider an Iowa corn farmer who doesn’t own the land he works on. He has to rent it from another farmer for $5/acre/year. He rents 100 acres to grow corn. The seeds cost $5 per bushel and it takes one bushel of seeds to plant one acre of corn. Fertilizer cost about $2 per acre, gasoline and equipment amortization adds $2 more per acre. This farmer has a degree in agronomy from the Iowa State University and he could have been working for a firm in Des Moines making about $400 a year. In the fall, farmer harvests 20 bushels of corn per acre. What is the cost of one bushel of corn?