Homework 7

Econ 201

1. (30 Points) Consider a firm with short-run production function Q=K+L. Right now, the firm has 10 units of K, $w = 3$, and $r = 10$.
   (a) (2.5 Points) Graph the short-run total product curve.
   (b) (2.5 Points per curve) Graph the short-run marginal and average product curves.
   (c) (2.5 Points per curve) Graph the short-run total cost, variable cost, and fixed cost curves.
   (d) (2.5 Points per curve) Graph the short-run marginal cost, average total cost, average variable cost, and average fixed cost curves.
   (e) (2.5 Points) In the long-run, what is the cost minimizing way for the firm to produce 100 units of output?
   (f) (2.5 Points) What is the total cost of producing the 100 units of output.
2. (20 Points) Consider a firm where, in the long-run, K and L are imperfect substitutes. The firm is currently production 1000 units of output with $K = 10$ and $L = 2$. A this mixture of inputs, the MRTS is 8. The cost of labor is 8 and the cost of capital is 24.
   (a) (10 Points) Is the firm minimizing the long-run cost of production?
   (b) (5 Poitns) Graph the situation with K on the y-axis.
   (c) (5 Points) If the firm is not minimizing long-run costs, what should it do?
3. (50 Points) Assume that the shoe industry is perfectly competitive. All firms in the market are identical, with $TC = 50 + 2Q + 2Q^2$, and $MC = 2 + 4Q$. The market supply curve is given by $P = \frac{Q}{25} + 2$ and the market demand curve is $P = 1000 - Q$.
   (a) (20 Points) How much will each firm produce?
   (b) (10 Points) What is the shut-down price for the firm?
   (c) (10 Points) Are profits positive or negative for a representative firm? Explain.
   (d) (10 Points) What do you expect to happen in the long-run?