Workout Book Problems:

16.3,16.9,19.10,21.1,21.3,21.7

1. Demand for giant pumpkins is: $q_d(p) = 2000 - 30p$. Supply is $q_s(p) = 10p$.

A. Sketch the supply and demand functions. (Be sure to put p on the y-axis!).

B. What is the equilibrium price and quantity for giant pumpkins?

C. If the government imposes a tax of \$20 per pumpkin, what will happen to the equilibrium price? Including this tax, how much will consumers pay per pumpkin?

D. On your sketch from part A, label the equilibrium price and quantities before and after the tax is imposed. Label the consumer surplus, producer surplus and area of Dead-Weight-Loss due to the tax.

E. What is the amount of dead-weight-loss?

2. For each of the following production functions, determine whether it has increasing, decreasing, or constant marginal product for x_1 and whether it has increasing, decreasing, or constant returns to scale.

A) $3x_1 + 2x_2$

B) $(3x_1 + 2x_2)^{\frac{1}{3}}$

C) $(x_1)^{\frac{1}{2}}(x_2)^{\frac{2}{3}}$

3. Find the Technical Rate of Substitution for the following production functions:

A) $3x_1 + 2x_2$

B) $(3x_1 + 2x_2)^{\frac{1}{3}}$

C) $(x_1)^{\frac{1}{2}}(x_2)^{\frac{2}{3}}$

4. A firm produces y using x_1, x_2 with the production function $x_1^{\frac{1}{2}}x_2^{\frac{1}{2}}$. However, x_2 is fixed at $x_2 = 4$. Thus, the short run production is $f(x_1) = 2x_1^{\frac{1}{2}}$. $w_1 = 2$ and $w_2 = 1$. The price of output is $p = 4$.

A) What is the firm's short run profit function?

B) What is the profit maximizing use of x_1 and output y?

C) What is the maximum profit it can attain?

D) If the firm could adjust x_2, what is the cheapest way to produce the y you found in part B?

5. A firm produces y using x_1, x_2 with the production function $x_1^{\frac{1}{4}}x_2^{\frac{1}{4}}$. $w_1 = 1$ and $w_2 = 1$. The price of output is $p = 40$.

A) What is the firm's TRS?

B) Write down an equation that implies TRS is equal to the slope of the isocost curves.

C) What are the firm's conditional factor demands for producing y units of output?

D) What is the firms cost function (the lowest cost of producing y units of output).

E) Write down the firm's profit function only in terms of y.

F) What is the firm's profit maximizing output and how much profit does it earn?