ECO101A: Introduction to Economics
Tutorial 2

1. A firm has a production process in which the inputs to production are perfectly substitutable in the long run. Can you tell whether the marginal rate of technical substitution is high or low, or is further information necessary? Discuss.
2. The marginal product of labor in the production of computer chips is 50 chips per hour. The marginal rate of technical substitution of hours of labor for hours of machine capital is 1/4. What is the marginal product of capital?
3. Do the following functions exhibit increasing, constant, or decreasing returns to scale? What happens to the marginal product of each individual factor as that factor is increased, and the other factor is held constant at some level?

a. $q = 3L + 2K$
b. $q = (2L + 2K)^{1/2}$
c. $q = 3LK^2$
d. $q = L^{\frac{1}{2}}K^{\frac{1}{2}}$
e. $q = 4L^{\frac{1}{2}} + 4K$

4. The production function for the personal computers of DISK, Inc., is given by $q = 10K^{0.5}L^{0.5}$, where q is the number of computers produced per day, K is hours of machine time, and L is hours of labor input. DISK's competitor, FLOPPY, Inc., is using the production function $q = 10K^{0.6}L^{0.4}$.

a. If both companies use the same amounts of capital and labor, which will generate more output?
b. Assume that capital is limited to 9 machine hours but labor is unlimited in supply. In which company is the marginal product of labor greater? Explain.

5. A firm pays its accountant an annual retainer of $10,000. Is this an economic cost?
6. The owner of a small retail store does her own accounting work. How would you measure the opportunity cost of her work?
7. Please explain whether the following statements are true or false.

a. If the owner of a business pays himself no salary, then the accounting cost is zero, but the economic cost is positive.
b. A firm that has positive accounting profit does not necessarily have positive economic profit.
c. If a firm hires a currently unemployed worker, the opportunity cost of utilizing the worker's services is zero.

8. Suppose a chair manufacturer finds that the marginal rate of technical substitution of capital for labor in his production process is substantially greater than the ratio of the rental rate on machinery to the wage rate for assembly-line labor. How should he alter his use of capital and labor to minimize the cost of production?
9. Assume the marginal cost of production is increasing. Can you determine whether the average variable cost is increasing or decreasing? Explain.