

Quiz #2 Post Mortem

Part I: Production and Cost Functions:

1. A firm with production function $Q = 2L^{1/2} + K^{1/2}$ has marginal product of labor of $\partial Q/\partial L = 1/2 L^{-1/2} = L^{-1/2}$; $MP_K = 1/2 K^{-1/2}$; the marginal rate of technological substitution (- slope of indifference curve) is $MRS = MP_K/MP_L = 1/2 (L/K)^{1/2}$ [or $2(K/L)^{1/2}$]; the production function is not homogeneous of degree one but it is *homothetic* because the MRS depends only on the ratio of K/L .
2. With 4 workers and 1 machine the firm produces $Q(4,1) = 2\sqrt{4} + 1 = 5$ units of output; $Q(9,1) = 2\sqrt{9} + 1 = 7$.
3. If the wage rate is \$1.00 and the services of a machine cost \$2.00 then the fact that 4 workers are required to produce 5 units of output with 1 machine implies that total costs will be \$6.
2. Since $Q = 2\sqrt{L} + 1$, $Q-1 = 2\sqrt{L}$, $L = [(Q-1)/2]^2$, and the total cost function is $C(Q) = [(Q-1)/2]^2 + 2$

Part III: Discriminatory Pricing:

Since $p_d = 100 - Q_d$ and $p_f = 200 - Q_f$, total revenue is $R(Q_d, Q_f) = Q_d(100 - Q_d) + Q_f(200 - Q_f)$ and total costs of $C(Q_1, Q_2) = 50 + (Q_1 + Q_2)$, profits are

$$\pi(Q_d, Q_f) = Q_d(100 - Q_d) + Q_f(200 - Q_f) - (10 + 50(Q_d + Q_f)).$$

Since $\partial\pi/\partial Q_d = 100 - 2Q_d - 50 = 0$ is a necessary condition for maximum profits, we must have $Q_d = (100-50)/2 = 25$, which yields $p_d = 75$; similarly, $\partial\pi/\partial Q_f = 200 - 2Q_f - 50 = 0$ implies $Q_f = 75$ and $p_f = 125$.

Part II: False-False Statements

1. At the "break-even-point" marginal cost is equal to average total cost. *TRUE*, a freeby.
2. A monopsony will hire workers to the point where the marginal labor cost is equal to the marginal revenue product. [If $w = k_0 + k_1L$, the the wage bill will be $wL = (k_0 + k_1L)L$ and marginal labor cost will be $k_0 + 2k_1L$. With this model, the imposition of a minimum wage may lead to an increase in employment!]
3. Under Chamberlin's monopolistic competition (and Joan Robinson's imperfect competition), price is greater than marginal cost (because the demand curve is downward sloping), marginal cost = marginal revenue (because of profit maximization), and total revenue equals total cost (because of free entry and exit).
4. According to *David Ricardo*, more fertile farmland yields a rent to its owners equal to the excess of revenue over cost. If the annual rent is \$1,000 and the interest rate is 20%, then the value of the land as determined by the forces of competition will be \$5,000 because at 20% interest that is the opportunity cost of foregone interest earnings at the bank if you rent the farm land for a year.
5. According to the *Averch-Johnson thesis*, a regulated electric utility is likely to invest too *much* in generating capacity, in order to maximize regulated profits, given the constraint that its profits must constitute no more than a "fair" rate of return on invested capital.
6. Insurance companies worry about "*moral hazard*;" for example, they worry that people with home owners insurance are more likely to smoke in bed and drivers with auto insurance will drive faster.
7. The price of heating oil futures is not determined by the Fed; the price is market determined; the market adjusts the price of heating oil futures so as to equate supply and demand. The price of heating oil tends to rise in the winter because of increased utilization.

Your "scaled grade" is the circled number on the front page of the quiz. Your "*adjusted scaled grade*" (ASG), which is the scaled grade plus 3 points, will be used in computing your course grade.

Quiz #2: Max = 98, Min = 63; Average = 85 (ASG)

Note: Special exclusive meeting from 12:10 to 1:00 in PAC 107 on Friday, November 14th for all students who received an *ASG* of 75 or below.