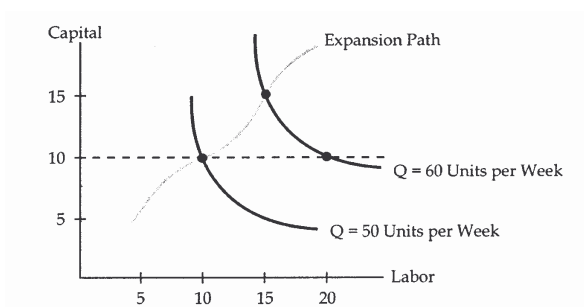


ECON 310  
 Homework Quiz 3  
 Wednesday, March 19

1. A firm has the production function  $\sqrt{KL}$ . Using calculus, the  $MPL = 1/2L^{-1/2}K^{1/2}$ , and the  $MPK = 1/2L^{1/2}K^{-1/2}$ . The wage rate is \$2 per hour and the rental rate is \$8 per hour. The firm decides to set output equal to 8 units. At the firm's optimal level of K and L, what are the firm's total costs?

- a. \$64
- b. \$136
- c. \$80
- d. \$36

Refer to the diagram below. The wage rate ( $P_L$ ) is assumed to be \$30 per hour, the capital rental rate ( $P_K$ ) is assumed to be \$15 per hour, and capital is assumed to be fixed in the short run at 10 units.



2. What is the short-run total cost of producing 60 units of output per week?

- a. \$675
- b. \$750
- c. \$600
- d. \$11.25

3. By comparing the two points on the expansion path, we can conclude that this technology exhibits

- a. decreasing returns to scale.
- b. constant returns to scale.
- c. increasing returns to scale.
- d. zero returns to scale.

Widgets are provided by a competitive constant-cost industry where each firm has fixed costs of \$30. The following chart shows the industry-wide demand curve and the marginal cost curve of a typical firm.

Industry Wide Demand		Firm's Marginal Cost Curve	
Price	Quantity	q	MC
\$5	1500	1	\$5
10	1200	2	10
15	900	3	15
20	600	4	20
25	300	5	25
30	200	6	30
35	140	7	35
40	50	8	40

4. Assume the industry is at its long-run competitive equilibrium. What is the price of a widget?

- a. \$10
- b. \$15
- c. \$20
- d. \$25

Suppose there is a SALES tax of \$15 per widget.

5. In the short run, how many firms leave the industry?

- a. 115
- b. 75
- c. 35
- d. 0

6. In the long-run, how many firms leave the industry?

- a. 115
- b. 75
- c. 35
- d. 0

7. A firm will shut down in the short run if its revenues fail to cover its

- a. fixed costs.
- b. variable costs.
- c. total costs.
- d. sunk costs.

8. Suppose all firms in an industry are identical. In the long run, entry and exit guarantee that all firms will have zero

- a. marginal cost.
- b. average cost.
- c. economic profit.
- d. accounting profit.

In assignment #1, problem 2, the demand curve for a good was given by the equation  $Q = -4P + 2500$  ( $P = -1/4 * Q + 125$ ) and the supply curve was given by  $Q = 2P - 100$  ( $P = 1/2Q + 50$ ). We found the equilibrium price and quantity to be \$100 and 100 units.

9. What is producer surplus at this equilibrium price and quantity?

- a. \$5000
- b. \$1250
- c. \$2500
- d. \$2116

In another part of the problem, we assumed the government imposed a sales tax of \$6 per unit. With this tax, we found the new market price to be \$96 and the new quantity to be 92 units.

10. What is consumer surplus after the tax?

- a. \$2668
- b. \$1334
- c. \$1058
- d. \$2116