

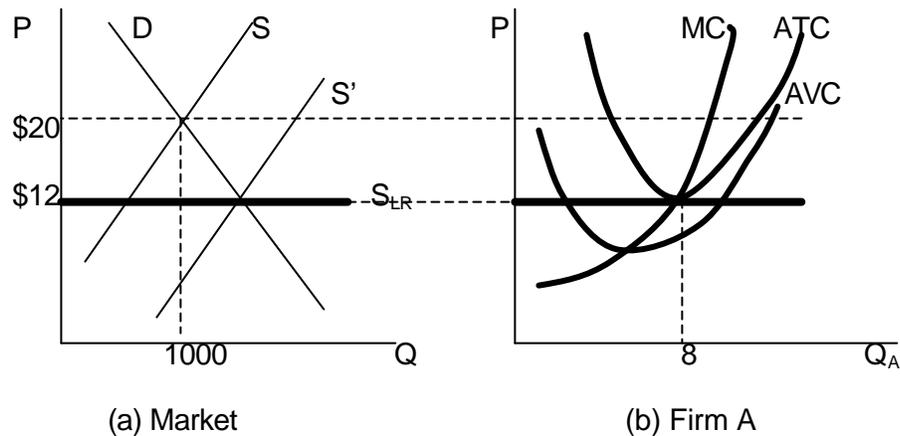
Economics 101

Practice Questions #4

Answer Key

1.

- a. The profit-maximizing output level of firm A is $Q_A^* = 10$.
- b. $TR = \$200$, $TC = \$150$, $TVC = \$100$, $TFC = \$50$, $AVC = \$10$, $AFC = \$5$, total economic profit = \$50.
- c. The shutdown price = \$8; the break-even price = \$12.
- d. In the short run, firm A stays in the market since there is a positive economic profit. In the long run, more firms enter into the market and then the market supply curve shifts to the right so that the long-run equilibrium price goes down to the level of the minimum point of the ATC, which is \$12 (as shown in the following figure). The long-run market supply curve is S_{LR} in the figure. Firm A has zero economic profit in the long run and the number of firms in the industry is more than in the short run.



2.

- a. Find the market equilibrium price first. We get $P = 30$ and this is the demand function facing firm B.
- b. Equate $MR = P = 30$ to $MC = 10Q_B$ and thus the profit-maximizing output level of firm B is $Q_B^* = 3$.
- c. $ATC = 5Q_B + 3/Q_B$; $AVC = 5Q_B$; the fixed cost is 3.
- d. ATC at $Q_B^* = 3$ is $5 \times 3 + 3/3 = 16$. Profit per unit at $Q_B^* = 3$ is $P - ATC = 30 - 16 = 14$. The total economic profit = $14 \times 3 = 42$.

(Or you can compute $TR = 30 \times 3 = 90$ and $TC = 5 \times 3^2 + 3 = 48$, so the total economic profit = $90 - 48 = 42$.)

- e. Firm B should not shut down the business since at $Q_B^* = 3$, $TR = 90 > TVC = 45$.
The shut down price = 0, the minimum point of AVC .

3.

- a. Equilibrium price in the market increases since the demand curve shifts outward. Thus, in the short run, firm C will increase output and enjoy a positive economic profit. In the long run, outside firms will enter the market and this will drive the supply curve to the right. Therefore, the long-run equilibrium price is back to \$10, firm C has no positive economic profit, and there are more firms in the market.

- b. In the short run, firm C can increase the production and enjoy a positive economic profit because of its lower ATC and MC. Since firm C is very small, the market equilibrium does not change in the short run.

In the long run, however, other firms can duplicate the new technology and also will have an incentive to enter the market. The market supply curve shifts out to the right. The long-run equilibrium price will become \$9, at this price firms earn zero economic profits, and there are more firms in the market than there were initially.

- c. Since the excise tax is imposed on every producer, the ATC and MC of firm C increase by \$1. The market supply shifts upward by \$1 too. Therefore, both in the short run and in the long run, the market equilibrium price increases to the new level where the new supply and demand curve intersect (but less than \$11). Firm C has no positive economic profit both in the short run and in the long run and the profit-maximizing output level decreases.

- d. The price ceiling is less than the original equilibrium price. Firm C will have a negative economic profit in the short run, but as long as \$9 is higher than the AVC at the profit-maximizing output level, it will stay in the market. However, since the policy is permanent, in the long run, all firms will exit and supply curve shifts to the left so that the long-run equilibrium quantity is 0.

- e. Equilibrium price in the market decreases since the demand curve shifts inward. Thus, in the short run, firm C will produce less and have a negative economic profit. But as long as the market price is still higher than the AVC at the profit-maximizing output level, it will stay in the market.

In the long run, this will cause the market supply curve to shift to the left restoring price to its initial level. Price returns to its original level, firms remaining in the industry produce the profit-maximizing quantity and earn zero economic profits, and there are fewer firms in the industry.

4.

a.

Type D					Type E				
Q _D	TC	ATC	AVC	MC	Q _E	TC	ATC	AVC	MC
0	6	-	-	-	0	12	-	-	-
1	12	12	6	6	1	30	30	18	18
2	22	11	8	10	2	46	23	17	16
3	36	12	10	14	3	60	20	16	14
4	56	14	12.5	20	4	84	21	18	24
5	80	18	14.8	24	5	110	22	19.6	26
6	114	19	18	34	6	144	24	22	34

For firms of type D, the MC curve passes through the minimum point of ATC, which is at approximately \$11; and the minimum point of AVC, which is at \$6. Likewise, for firms of type E, the MC curve passes through the minimum point of ATC, which is at approximately \$20; and the minimum point of AVC, which is at approximately \$16.

- b. Both type D and type E will stay in the market when the market price is \$24. Firms of type D will produce 5 units of goods and the economic profit is \$40. Firms of type E will produce 4 units of goods and the economic profit is \$12.
- c. Only type D will stay in the market when the market price is \$14, since for firms of type E, the market price (\$14) is less than AVC at the profit-maximizing output level (\$16). Firms of type D will produce 3 units of goods and the economic profit is \$6.
- d. Only type D will stay in the market when the market price is \$10. Firms of type E will shut down the business by the same reason in c. For firms of type D, the market price (\$10) is still higher than AVC at the profit-maximizing output level (\$8) and thus will stay. Firms of type D will produce 2 units of goods and the economic profit is -\$2 (in other words, a loss of \$2).
- e. The long-run equilibrium price is the minimum point of ATC of type D, which is at approximately \$11.