

Econ 30010
Intermediate Microeconomic Theory
Answers to Additional Perfect Competition Problems

1. a. Firm supply: $q_s = P/8$

Market supply: $Q_s = 5P$

Market-clearing price: $5P = (36300)^{1/2} - .5P$ implies $P = 34.64$

Equilibrium quantities: $Q = 173.21$ and $q = 4.33$

Equilibrium profit: $\pi = 0$ (So this is also a long-run equilibrium)

b. See below.

c. New firm supply: $q_s = P/10$

Market supply: $Q_s = 4P$

Market-clearing price: $4P = (36300)^{1/2} - .5P$ implies $P = 42.34$

Equilibrium quantities: $Q = 169.36$ and $q = 4.23$

Equilibrium profit: $\pi = (42.34)(4.23) - 80 - 5(4.23)^2 = 9.63$

d. A long-run equilibrium must imply $\pi = 0$ which means price equals the minimum of $AC(q)$.

$AC(q) = MC(q)$ implies $80/q + 5q = 10q$ or $q = 4$ and $AC(4) = 40$. Thus, the long-run equilibrium price will equal 40.

The quantity-demanded at a price of 40 is $Q_d = (36300)^{1/2} - .5(40) = 170.52$.

With each firm producing 4 units, the long-run number of firms equals 42.

e. The increase in costs has two effects: marginal cost increases and average cost increases. The increase in marginal cost decreases firm supply from MC_0 to MC_1 and market supply from S_0 to S_1 and results in a higher price and a lower market quantity in the short run. However, the increase in average cost from AC_0 to AC_1 can be either smaller or greater than the increase in marginal costs. In this case, firms have an incentive to produce at a smaller scale which implies a smaller change in average costs than marginal costs. We know that firms will only be able to pass a fraction of marginal cost increases on to consumers in the form of a higher price. If the price increase is large enough, it can be sufficient to more than offset the change in average cost. That is what happens in this example. The result is that firms will earn positive economic profit in the short-run.

In the long run, more firms will enter. This will increase market supply to S_2 and cause the market price to fall and the market quantity to increase relative to the new short-run equilibrium but price will be higher and market quantity will be lower than in the original

equilibrium. At the firm level, output decreases to the new efficient operating scale.

