Problem Examples:

1. Suppose a perfectly competitive firm has the short-run cost function

$C(q) = 125 + q^2$.

a. What is the profit maximizing level of output at prices of $30 and $20 and what is profit at each price?

b. At what price does the firm reach the shut-down point?

Solution:

a. The marginal cost equation is MC = 2q. When p = $30, q* = 15, π = $100. When p = $20, q* = 15, π = -$25.

b. The firm should keep operating since TR > TVC. The firm should shut down when AVC > MC (normally, the minimum point of AVC). In this case, however, average variable cost is linear with slope of 1, and MC is linear with slope of 2, making all positive output levels above the shutdown point. You can show diagrams.

2. Each of 1000 identical firms in the competitive peanut butter industry has a short-run marginal cost curve given by

SRMC = 4 + Q.

If the demand curve for this industry is P = 10 - 2Q/1000,

what is the equilibrium price and quantity in this industry and how much does each firm produce?

Solution:

SR supply = ∑MCi = ∑(4 + Qi) Solve for Qi = MCi – 4
1000Qi = Q = 1000 MC – 4000

MC = P, so Q = 1000 P - 4000, which means that industry supply is given by P = 4 + Q/1000.
SR equilibrium Q: 4 + Q/1000 = 10 - 2Q/1000

3Q/1000 = 6, Q = 2000, P = 6.