

**Econ 302, Fall 2013**  
**Assignment 1: Pure Competition**

The due date for this assignment is **Wednesday, September 25** (in class or by dropping it to my mailbox by **3:00 p.m.**). Assignments can be done in groups of up to three people. The submitted papers must be stapled and clearly written. Late assignments won't be accepted as the answers will be posted on the due date.

**Part 1: True/False questions. Fully explain your answers.**

1. When operating in the short run a perfectly competitive firm is facing an average variable cost of  $AVC(y) = 10 - 2y + 0.5y^2$ . Given that the ongoing market price is  $p = \$6$  the firm should keep on operating in the short run.
2. At any optimal level of production  $y^*$  the average fixed cost of a competitive firm is expressed as the vertical distance between the average total cost and the average variable cost (both evaluated at  $y^*$ ) multiplied by  $y^*$ .
3. A permanent per-unit tax (long-run) in a competitive market will be shared between the consumers and the producers.
4. A competitive firm will keep on producing in the long run as long as the producer surplus is more than zero.

**Part 2: Analytical problems. Do the problems in the order given.**

1. In a local wholesales market for wheat in Yorkton Saskatchewan, there are 1,000 farmers looking to sell their wheat crop. Each farmer recognizes that his individual production choices do not affect the market price, thus this market is considered to be perfectly competitive. The farmers have a cost function given by  $c[y_i] = 32 + 10y_i + 2y_i^2$ , ( $i = 1, 2, \dots, 1,000$ ).
  - (a) Identify the fixed and variable costs of a single farmer. What are the average fixed, average variable, and average total costs? What is the marginal cost? Present the marginal cost and all the averages costs in a graph.
  - (b) What is the supply function of an individual farmer in this industry? What is the industry's supply function?
  - (c) The demand for wheat in this market is given by  $D[p] = 9,500 - 50p$ . What is the market price? How much each farmer will sell? What is the profit an individual farmer is making?
  - (d) Will farmers enter or exit this local market in the long-run? What will the long-run price be? Assuming that the demand given in part (c) also represents the long-run demand find the number of farmers who will be in this market in the long-run.

2. A competitive firm has an average variable cost function given by  $AVC[y] = 10 + 4y$ . Moreover, when the market price is \$42, the firm's maximum profit is \$14. Given this information:
- Derive the firm's cost function  $c[y]$ , marginal cost,  $MC[y]$ , and average total cost,  $ATC[y]$ . Show  $MC[y]$ ,  $AVC[y]$ , and  $ATC[y]$  on a graph.
  - Let the market price be \$82. How much will the firm produce? Determine the associated profit and producer surplus. Show your results in the graph you constructed for part (a).
3. Consider two types of firms in a competitive industry, namely type 1 and type 2, with cost functions  $c_1[y_1] = 10 + 5y_1 + 0.5y_1^2$ , and  $c_2[y_2] = 20 + y_2 + 0.75y_2^2$ . There are 150 firms of type 1 and 360 firms of type 2. Find the individual supplies and use horizontal summation to derive the industry supply (algebraically).