

## 11.9 Exercises

1. A town has recently built its first desalinization plant, allowing the town to make use of the immense quantity of saline ground water in its region. The town also takes advantage of a limited supply of high quality surface water flowing nearby. Suppose that the marginal processing costs of each of these sources are constant, and that overall marginal costs are given as follows:

$$MC(w) = \begin{cases} k_1 & \text{if } w \leq W' \\ k_2 & \text{if } w > W' \end{cases}$$

where  $W'$  is the amount of available surface water and  $k_2$  is much higher than  $k_1$ . Assuming that we are only concerned with variable (i.e., operation and maintenance) costs and the town can build as much desalinization capacity as it wants, determine functions for both total variable costs (TVC) and average variable costs (AVC). (Plant construction costs have no relevance because the town properly uses new connection charges to pay for them.) Illustrate both  $MC(w)$  and  $AVC(w)$  on the same graph.

2. Extend the point expansion program constructed for exercise 2 of the prior chapter. Add one additional informational input, supply elasticity, and set up the program to generate four additional results (the various supply functions).