

**Problem Definition**

Problem 57. The cost in dollars of producing  $x$  units of a product is  $C = 1.35x + 4570$ .

- (a) Find the average cost  $\bar{C}$ .
- (b) Find  $\bar{C}$  when  $x = 100$  and  $x = 1000$ .
- (c) What is the limit of  $\bar{C}$  as  $x$  tends to infinity.

**Solution Step 1:**

For part (a) we need to divide the cost by the number of items produced. That is,

$$\bar{C} = \frac{C}{x} = \frac{1.35x + 4570}{x} = 1.35 + \frac{4570}{x}$$

**Solution Step 2:**

For part (b) we can compute

$$\bar{C} = 1.35 + \frac{4570}{100} = 47.15$$

and

$$\bar{C} = 1.35 + \frac{4570}{1000} = 5.92$$

which shows that the more we produce the lower the average cost of production. The total cost of production is higher. However, one would hope the revenue would be higher with higher production.

**Solution Step 3:**

To determine an answer for part (c) we need to compute the limit as  $x \rightarrow \infty$ . This gives

$$\lim_{x \rightarrow \infty} \bar{C} = \lim_{x \rightarrow \infty} \left( 1.35 + \frac{4570}{x} \right) = 1.35$$

The result shows that as production goes up the fixed costs are absorbed reducing the cost of production per item.