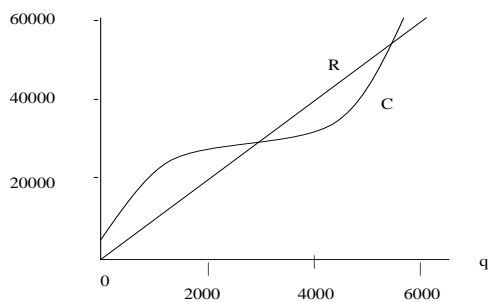Section 2.5
Marginal Cost and Marginal Revenue

1. Cost and revenue functions are given in the figure below.

(a) At a production level of $q = 3000$, is marginal cost or marginal revenue greater? Explain what these values of MC and MR tell you about whether production should be increased or decreased.

(b) Answer the same questions for $q = 5000$.

2. Let $C(q)$ represent the cost, $R(q)$ the revenue, and $\pi(q)$ the total profit, in dollars, of producing q items.

(a) If $C'(50) = 75$ and $R'(50) = 84$, approximately how much profit is earned by the 51st item?

(b) If $C'(90) = 71$ and $R'(90) = 68$, approximately how much profit is earned by the 91st item?

(c) If $\pi(q)$ is a maximum when $q = 78$, how do you think $C'(78)$ and $R'(78)$ compare to each other? Explain.

3. The following table gives the cost and revenue, in $, for different production levels q.

q	0	100	200	300	400	500
R(q)	0	500	1000	1500	2000	2500
C(q)	700	900	1000	1100	1300	1900

(a) At approximately what production level is profit maximized?

(b) What price is charged per unit for this product?

(c) What are the fixed costs of production?

4. The world's only manufacturer of left-handed widgets has determined that if q left-handed widgets are manufactured and sold per year at a price p, then the cost function is $C = 8000 + 40q$, and the manufacturer's revenue function is $R = pq$. The manufacturer also knows that the demand function for left-handed widgets is $q = 2000 - 25p$.

(a) Using the demand function, rewrite the cost and the revenue functions in terms of price p.

(b) Compute $C(55)$ and $R(55)$ with your functions from part (a), and interpret what they mean.

(c) Write the profit function π in terms of price p and sketch its graph.

(d) For what price is the profit largest? Based on your answer, how many left-handed widgets should be produced?