# Essentials of Calculus
Homework 2.5
## Marginal cost and revenue

1. The cost (in dollars) of making q pencils is $C(q)$.

   a) What are the units of the marginal cost?

   b) What would it mean for the marginal cost to be $MC = 2$ for $q = 200$?

2. It costs $200 to produce 50 hammers and $250 to produce 55 hammers. Approximate the marginal cost at a production level of 50 hammers.

3. The graph of the cost in dollars to make q items is given below.
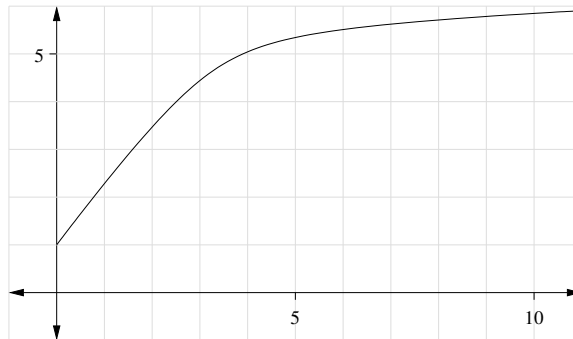
   Estimate the marginal cost at a production level of 5 items. Give the units and interpret the result.

4. The graph of the cost in dollars to make q pens is given below.
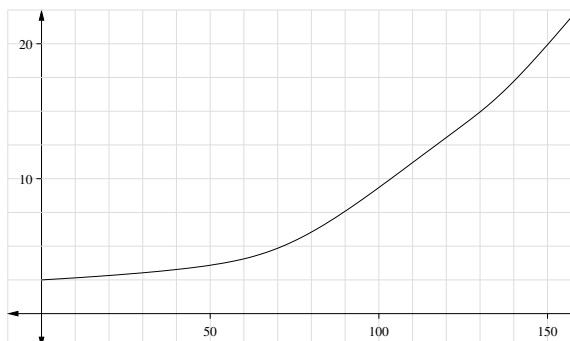
Estimate the marginal cost at a production level of 50 items. Give the units and interpret the result.

5. The graph of the cost in dollars to make q items is given below.
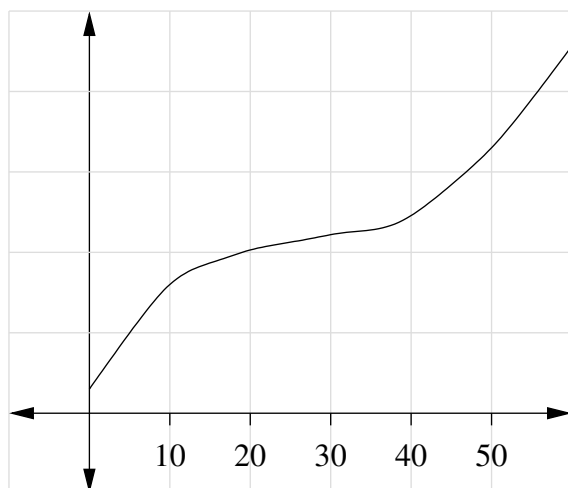

a) Which is larger, $MC(10)$ or $MC(30)$? Explain.

b) Which is larger, $MC(20)$ or $MC(50)$? Explain.

6. The cost of making q gallons of carbonated beverage is given by the following table.

q (gallons)	100	200	300	400
$C(q)$ (dollars)	250	360	460	540

Approximate the marginal cost at $q = 200$ gallons, including the units.

7. The revenue from selling q items is $R(q)$, where $R(20) = 200$ and $MR(20) = 15$. Approximate the revenue obtained by selling 21 items and 19 items.

8.   a) Suppose a company is making 200 items, and $MC(200) = 15$ and $MR(200) = 20$. About how much additional profit would it get from making one more item?

  b) Suppose a company is making 100 items, and $MC(100) = 12$ and $MR(100) = 10$. Should it make an additional item? Why or why not?

  c) Suppose a company is making 300 items, and $MC(300) = 25$ and $MR(300) = 31$. Should it make an additional item? Why or why not?

9. The following graph shows the cost and revenue functions for a company.
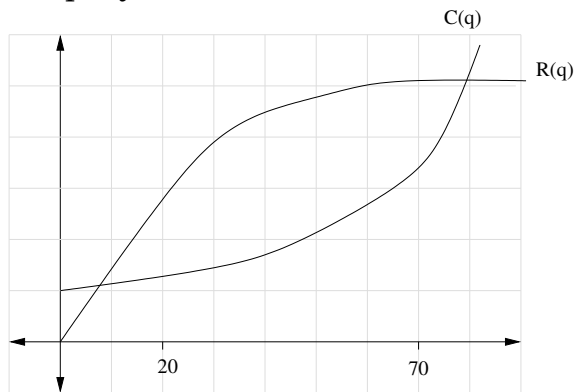
a) If the company makes 20 items, should it make another? Explain your answer using marginal cost and marginal revenue.

b) If the company makes 70 items, should it make another? Explain your answer using marginal cost and marginal revenue.

10. A company has a cost function $C(q)$ and revenue function $R(q)$, with $C(100) = 150, R(100) = 200, MC(100) = 10$ and $MR(100) = 12$.

a) What is the profit at $q = 100$?

b) If the production level increases from 100 to 101, by about how much does the profit change?