# Chapter 10 – 5b Basic Differentiation Properties

**Example 5.** The total cost (in dollars) to produce x television sets is given by

A) Sketch C(x) on the closed interval [0, 200].

B) Find the exact cost of producing the 101st television set.

C) Use the marginal cost to estimate the cost of producing the 101st television set.

**Example 6.** A company producing computer components has determined that, on average, a new employee can assemble N(t) components per day after t days of on-the-job training as given by

A) Sketch N(t) on the closed interval [2, 10].

B) What is the average rate of change in the number of components per day from day 4 to day 6?

The number of components assembled per day is increasing by 3.333 per day.

C) What is the instantaneous rate of change in the number of components per day at the end of the 5th day?

After 5 days of training, a new employee can produce 24 components a day and the employee’s production rate is increasing by 3.2 components per day for each day of additional training.

**Example 7.** A sewage treatment plant disposes of its effluent through a pipeline that extends one mile toward the center of a large lake. The concentration of the effluent C(x) in parts per million x meters from the end of the pipe is approximately

A) Sketch C(x) on the closed interval [1, 100].

B) Find C(10) and C’(10) and interpret the results.

At a distance of 10 meters from the end of the pipe, the concentration of effluent is 5 parts per million and the concentration is decreasing by 1 part per million per meter.

C) Find C(90) and C’(90) and interpret the results.

At a distance of 90 meters from the end of the pipe, the concentration of effluent is about 0.062 parts per million and the concentration is decreasing by about 0.0014 parts per million per meter.