Applications
Lecture 26
Section 3.1

Robb T. Koether

Hampden-Sydney College

Tue, Mar 7, 2017

Objectives

Objectives

- Apply the methodology of finding extreme values to applications in economics.

Exercise 53

The total cost of producing x units of a certain commodity is $C(x)$ thousand dollars, where

$$C(x) = x^3 - 20x^2 + 179x + 242.$$

Exercise 53

The total cost of producing x units of a certain commodity is $C(x)$ thousand dollars, where

$$C(x) = x^3 - 20x^2 + 179x + 242.$$

(a) Find $A'(x)$, where $A(x) = \dfrac{C(x)}{x}$ is the average cost per unit produced.

Exercise 53

The total cost of producing x units of a certain commodity is $C(x)$ thousand dollars, where

$$C(x) = x^3 - 20x^2 + 179x + 242.$$

(a) Find $A'(x)$, where $A(x) = \dfrac{C(x)}{x}$ is the average cost per unit produced.

(b) For what values of x is $A(x)$ increasing? For what values is it decreasing?

Exercise 53

The total cost of producing x units of a certain commodity is $C(x)$ thousand dollars, where

$$C(x) = x^3 - 20x^2 + 179x + 242.$$

(a) Find $A'(x)$, where $A(x) = \dfrac{C(x)}{x}$ is the average cost per unit produced.

(b) For what values of x is $A(x)$ increasing? For what values is it decreasing?

(c) For what level of production x is the average cost minimized? What is the minimized cost?

Exercise 60

The value V (in thousands of dollars) of an industrial machine is modeled by

$$V(N) = \left(\frac{3N + 430}{N + 1}\right)^{2/3}$$

where N is the number of hours the machine is used each day. Suppose further that usage varies with time in such a way that

$$N(t) = \sqrt{t^2 - 10t + 61}$$

where t is the number of months the machine has been in operation.

Exercise 60

The value V (in thousands of dollars) of an industrial machine is modeled by

$$V(N) = \left(\frac{3N + 430}{N + 1}\right)^{2/3}$$

where N is the number of hours the machine is used each day. Suppose further that usage varies with time in such a way that

$$N(t) = \sqrt{t^2 - 10t + 61}$$

where t is the number of months the machine has been in operation.

(a) Over what time interval is the value of the machine increasing? When is it decreasing?

Exercise 60

The value V (in thousands of dollars) of an industrial machine is modeled by

$$V(N) = \left(\frac{3N + 430}{N + 1} \right)^{2/3}$$

where N is the number of hours the machine is used each day. Suppose further that usage varies with time in such a way that

$$N(t) = \sqrt{t^2 - 10t + 61}$$

where t is the number of months the machine has been in operation.

(a) Over what time interval is the value of the machine increasing? When is it decreasing?

(b) At what time t is the value of the machine the largest? What is this maximum value?