

MA104 Lesson 17

SOLVING OPTIMIZATION PROBLEMS I

Tuesday, 12 February, 2008

Outline

- 1 Admin
- 2 Last Class
- 3 SOLVING OPTIMIZATION PROBLEMS I
 - Course Guide
 - SOLVING OPTIMIZATION PROBLEMS I
 - Definitions
 - An Example
 - Do Problem - Help
 - The Dreaded Thayer Board Work
- 4 Look Forward - SOLVING OPTIMIZATION PROBLEMS II
 - Course Guide

Admin

- 1 Quiz will be on Thursday to avoid a quiz on the same day as your Chemistry WPR.
- 2 Fundamentals of Derivative participants will take the make-up on Friday during normal class time. Come to my office during the normal class time to receive the make-up. Anyone can take this make-up to strengthen their derivative skills.

Derivatives and the Shapes of Curves

Questions?

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Objectives

- ① Model and solve optimization problems.
 - ① Given a problem, be able to determine a single or multivariable objective function.
 - ② Given limitations in a problem, write a constraint equation.
 - ③ Transform a multivariable objective function into a single variable objective function when only one constraint exists.
- ② Reinforce understanding of the problem solving technique and apply it to optimization problems such as (but not limited to):
 - ① Minimize materials given an area or volume constraint.
 - ② Maximize area or volume given a material constraint.
 - ③ Minimize cost.
 - ④ Minimize distance or cost given physical layout constraints.
 - ⑤ Other various applications as introduced by your instructor.

READ

- 1 Stewart: Section 4.7, pages 322-327.
- 2 Student Notes.

THINK ABOUT

- 1 The textbook presents a method for solving optimization problems on page 322. At which step would it be best to check your work using Mathematica? Specifically, what would you graph with it?
- 2 In Example 2 on page 323, why do we need to check that the value obtained is an absolute minimum?
- 3 In all the examples, how is the maximum or minimum value verified (there are numerous answers to this question)?

DO Problems

① Section 4.7/ 3, 6, 13

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Definitions

- ① Steps in solving optimization problems - pg 322
 - ① Understand the problem
 - ② Draw a diagram
 - ③ Introduce Notation
 - ④ Express Q
 - ⑤ Find a relationship
 - ⑥ Find absolute Max or Min
- ② First derivative test for absolute extreme values - pg 324

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An Example

From Board Sheet

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Do Problem - Help

Section 4.7/ 3, 6, 13

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Board Work

① From Board Sheet

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LESSON 18 - SOLVING OPTIMIZATION PROBLEMS II

1 OBJECTIVES:

- 1 Model and solve optimization problems.

2 READ:

- 1 Stewart: Section 4.7, pages 322-327.

3 THINK ABOUT:

- 1 The textbook presents a method for solving optimization problems on page 322. At which step would it be best to check your work using Mathematica? Specifically, what would you graph with it?
- 2 In Example 2 on page 323, why do we need to check that the value obtained is an absolute minimum?
- 3 In all the examples, how is the maximum or minimum value verified (there are numerous answers to this question)?

4 DO:

- 1 Section 4.7/ 12, 24, 31, 33

Questions?

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