

Mathematics 116: Convexity and Optimization with Applications

Assignment #8 due January 14, 2004.

Announcements: So as not to let too many weeks go by, let's plan to meet at our usual time and place on Wednesday, January 14, 2004. This homework will be due then and there. Watch your e-mail concerning other possible review sessions.

Projects are due on Tuesday, January 20, in the mailbox labeled Math 116 outside Science Center 325. Graded projects and homework will be in that box for you to pick up before the final examination, which is presently scheduled by the Registrar for the morning of Tuesday, January 27.

Reading: Chapters 7 and 8. Look over 9 as well.

Problems: Find a curve x joining the given endpoints that extremizes J :

A.
$$J[x] = \int_0^2 \frac{\dot{x}^2}{x^3} dt \quad \text{with } x(0) = 1 \text{ and } x(2) = 4.$$

(There may seem to be two solutions. How can you rule one out?)

B.
$$J[x] = \int_0^1 \frac{\sqrt{(1 + \dot{x}^2)}}{x} dt \quad \text{with } x(0) = 0 \text{ and } x(1) = \sqrt{3}.$$

(To simplify your results, try the substitution we introduced in class when working on the brachistochrone.)

Exercises: Do any *six* of the following potential problems:

§7.14: #1 and 2, #13, #14, #17, #18, #19, #20, #21.

§8.8: #8, #9, #10, #14.

Writing: See the handout concerning projects.