

**Classical Mechanics, Phys105A, Wim van Dam, UC Santa Barbara**  
**Homework 7, v3; due Monday March 12, 11:30 am**

**Question 1** (Minimizing the border, 10 points).

- ▷ (a) Taylor, Problem 6.22.

**Question 2** (Straight line in 3 dimensions, 10 points).

Using the Euler-Lagrange Equation for several variables.

- ▷ (a) Taylor, Problem 6.27.

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Write the answers to the questions below on a separate set of pages.

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**Question 3** (Fermat's principle, 10 points).

Light does not always travel the shortest route between two points:

- ▷ (a) Taylor, Problem 6.5.

**Question 4** (The shape of soap, 10 points).

Deriving some properties of the *catenary*.

- ▷ (a) Taylor, Problem 6.19.

**Question 5** (The perfect pendulum, 15+5 points).

- ▷ (a) Taylor, Problem 6.25, "Show that ... equal to  $\pi\sqrt{a/g}$ ."
- ▷ (b) Taylor, Problem 6.25, "Explain qualitatively how this ... can possibly be true."