

Below is a selection of problems related to section 4.5, L’hopital’s rule and 4.6, optimization problems. These problems will not be collected or graded. However, you should understand how to work each of these problems. You should begin working on these problems in groups in recitation. You will probably want to finish these problems outside of class. If you have questions, please ask your TA or instructor. If you find a problem difficult, consider working similar problems from the text for additional practice.

Announcements: 1. The final for this course is in CB122 (note room change!) from 8:30–10:30 on Monday, 14 December 1998. 2. The last project is due on 4 December 1998.

1. Written homework due at 10am on 7 December 1998. §4.5 14, 48. §4.6 10, 30.
2. Section 4.5 #1, 3, 5, 7, 9, 13, 15, 43, 47.
3. Section 4.6 #1, 3, 9, 11, 17, 21, 31.
4. Find two functions f and g where

$$\lim_{x \rightarrow 0} \frac{f(x)}{g(x)} = 7 \quad \text{and} \quad \lim_{x \rightarrow 0} \frac{f'(x)}{g'(x)} = 3.$$

Can you replace 3 and 7 by any numbers a and b ?

5. (Review) Differentiate e^{-3x^2} and $\sqrt{1 - \sin^2 x}$.
6. (Review) Suppose that the two shortest sides of a right triangle $a(t)$ and $b(t)$ vary with time and after t seconds $a(t) = t^2$ meters and $b(t) = t$ meters.
 - (a) Let $c(t)$ be the hypotenuse and find $c'(t)$.
 - (b) Let β be the angle opposite the side whose length is $b(t)$ and find $\beta'(2)$.
 - (c) Why is $\alpha'(t) = -\beta'(t)$? Here, α denotes the angle opposite the side whose length is $a(t)$.