

## Homework #8: Due Thursday, Nov 3, at noon

Problems are taken from the exercises in the Hughes-Hallett textbook. Read through the text before working on the problems, and please make use of office hours provided by the teaching staff or the Math Learning Center if you find them difficult. Submit your homework either to your instructor during lecture or to your TA during recitation or at their office. Late homework assignments will not be accepted.

### Problems

Write up these problems neatly and submit them by the due date above. Show your work where appropriate for full credit. If your homework solutions require multiple pages, please staple them together.

- Section 4.1: 2, 8, 12, 16, 18, 22
- Section 4.2: 4, 10, 14, 16, 22, 30. On 14 and 16, use the first or second derivative tests to characterize each critical point, and confirm your answer with a graph.
- Extra Problem: Let  $f(x) = x^2 - 6x + 4 \ln x$ . Note that the domain of this function is  $x > 0$ .
  - (a) Find  $f'(x)$  and  $f''(x)$ .
  - (b) Find the critical points of  $f(x)$ .
  - (c) Find the intervals on which  $f$  is increasing and on which  $f$  is decreasing.
  - (d) Using the First Derivative Test, determine whether each critical point of  $f$  is a local minimum, a local maximum, or neither.
  - (e) Use the Second Derivative Test to check your answers to part (d). If that is not possible, explain why.
  - (f) Find the inflection points of  $f(x)$ .

### Exercises

Attempt these problems, but *do not* submit your solutions to be graded. The exams may include problems similar to these ones.

- Section 4.1: 3, 4, 9–11, 13–14, 17, 23, 25, 27, 31
- Section 4.2: 1–3, 11–13, 17–19, 21, 23, 29, 33–35