

## Homework 02

1. Section 8.8: Problems: 35, 39, 41, 45, 55, 65, 66.

2. Section 8.8:

Let  $f(x) = \frac{1}{x^{0.5} \ln x}$ . Is the improper integral  $\int_e^\infty f(x) dx$  convergent?

Hint: Try not to find the anti-derivative of  $f(x)$ , but instead find a suitable  $g(x)$  for comparison using Theorem 2 or Theorem 3. See also Example 5-7 of Lecture 02 on how to find  $g(x)$ .

3. Section 8.8:

Do the same for  $\int_0^{\frac{1}{e}} \frac{1}{x^2 |\ln x|} dx$ .

4. Section 10.1: Problems 46, 53, 59, 63, 67, 69, 73, 81, 87, 89.

Hint for problem 73: Read Appendix A.5, "Limit 6".

Hint for problem 87: Multiply by  $\frac{n + \sqrt{n^2 - n}}{n + \sqrt{n^2 - n}}$ .

Hint for problem 89: Use Theorem 4 and Fundamental Theorem of Calculus + L'Hôpital's Rule.

5. Section 10.2: Problems 31, 33, 43, 61, 63, 65, 71, 78.