Twelfth Homework: MATH 410
Due Tuesday, 24 November 2009

1. Exercise 2 of Section 6.3 in the text.
2. Exercise 1 of Section 6.4 in the text.
3. Exercise 3 of Section 6.4 in the text.
4. Exercise 6 of Section 6.4 in the text.
5. Exercise 9 of Section 6.4 in the text.
6. Prove Proposition 2.1 in the lecture notes
7. Prove Proposition 2.6 in the lecture notes
8. Prove Theorem 2.5 in the lecture notes
9. Show that every nonempty open interval (a, b) does not have measure zero.
10. Show that the Cantor set has measure zero.
11. Prove formula (30) in the lecture notes for the case $p = -1$.
12. By taking the limit of Riemann sums, show for every positive a and b that

$$\int_0^b a^x \, \mathrm{d}x = \frac{a^b - 1}{\log(a)} \,.$$

Hint: Use uniform partitions.