Homework 1 - Math 574, Frank Thorne (thornef@mailbox.sc.edu)

Due Friday, January 20 at 5:00.

Instructions. The problems come in three flavors: **core**, **additional**, and **bonus**.

The **core** problems are required. Each week two or three problems will be selected at random and graded for accuracy. Do only the core problems if you're confident you can answer them completely and correctly!

The **additional** problems are for those who choose to do extra practice. If you hand in both the additional and the core problems, then your homework will be graded more leniently. In particular, if I happen to grade core problems which you solved incorrectly or skipped, then I will look in the additional section to see if you solved similar problems correctly. Also, some of these problems will show up on the exams.

The **bonus** problems are extra credit for anyone who wants an additional challenge (up to a total of 11/10 for each week).

All problems (other than those written out explicitly) are from Epp's book.

Core:

1.1, 3-10 odd.

1.2, 1, 2, 3, 5, 6, 7(a-c), 8, 9(a-e), 11; 1.3, 15. (You don't need to justify your answers in questions such as 1, 9, and 11.)

Write out every function from the set $A = \{1, 2, 3\}$ to $B = \{r, s\}$. How many are there? Draw arrow diagrams for any two of these functions (your choice).

2.1, 1, 3, 6, 8, 13, 15, 17, 25, 27, 32, 40, 44.

Additional:

1.1, 3-10 even. 1.2, 4, 7(d-f), 9(f-j). 2.1, 2, 4, 9, 12, 14, 16, 18, 41, 45.

Bonus:

(2 point; *Russell's paradox*) Let S be the set of all sets which do not contain themselves. Does S contain itself? Explain thoroughly.

(2 points) 2.1, 46.

Finally: The homeworks are intended to take up to eight hours a week but not more. If you spend more time on this or any other single homework, please let me know.