

Problem Set 4  
Due Friday, May 2.

*Mathematical Logic*

Math 114L, Spring Quarter 2008

1. (20 pt.) Exercise 4 in Section 1.7 of the textbook.
2. (10 pt.) Compute

$$\text{free}((v_1 \wedge \forall v_1(Pv_1v_2 \rightarrow Pv_2v_3))).$$

3. (20 pt.) Exercise 1 in Section 2.1 of the textbook. (Include all the parentheses and avoid abbreviations.)
4. (10 pt.) Exercise 3 in Section 2.1 of the textbook.
5. (20 pt.) Exercise 5 in Section 2.1 of the textbook. (Feel free to use the notational conventions (p. 78) to make the formulas more readable.)
6. (20 pt.) Exercise 2 in Section 2.2 of the textbook.
7. (20 pt. extra credit.) Specify a first-order language appropriate for discussing vector spaces over the rational numbers  $\mathbb{Q}$ .