## Problem Set $8 \quad$ Foundations Due 4/24/2006

Each problem is worth 5 points. Clear and complete justification is required for full credit. You are welcome to discuss these problems with anyone and everyone, but must write up your own final submission without reference to any sources other than the textbook and instructor.

1. Suppose that two dice are tossed. What is the probability that the first one rolls a value twice as large as the second?
2. A card is drawn from a standard deck, then replaced, and a second card is drawn. What is the probability that neither card is a face card, but that the first is black and the second red?
3. Suppose that $N$ is a Peano system. Show that $x \neq y \Rightarrow x^{\prime} \neq y^{\prime}$.
4. Regarding 2 as the element $\left(0^{\prime}\right)^{\prime}$ of a Peano system, compute $2+2$.

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