

PROBLEM SET 8 HINTS

2.5

- 6. Which arguments make sense symbolically?
- 12. Let $P(x)$ be $\exists n, x = 2n$.
 - (a) We need to prove that $\forall k, \ell, P(k) \wedge P(\ell) \rightarrow P(k + \ell)$
 - (b) We need to prove that $\forall k, \ell, P(k) \wedge P(\ell) \rightarrow P(k \cdot \ell)$

4.1

- 19. Consider the base case.
- 23. (a) Notice that $k + 1 = 2 + (k - 1)$
 - (b) Notice that $k + 1 = 5 + (k - 4)$
- 24. (b) Use strong induction.

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- 4. Same as Q23, section 4.1. Notice that $k + 1 = 3 + (k - 2)$
- 5. Notice that $12^2 = 11 + 133$.
- 6. Suppose the conclusion is false for contradiction and use the well ordering principle.
- 8. Use the hint given, and imagine yourself as a student wearing a white hat when the teacher comes back for the $(k + 1)$ st time. Knowing that if only k students are wearing white hats, they would figure it out at the k th time (inductively), can you figure out which hat you're wearing?
- 9. The last move involves putting together two blocks, each requiring a certain amount of moves (say n_1 and n_2). The total amount of moves is therefore $n_1 + n_2 + 1$. Now use induction to figure out what n_1 and n_2 are.