PROBLEM SET 2

DUE JANUARY 24

(1) Exercise 1.4.5
(2) Prove Theorem 1.4.7. Hint: Let m be fixed, and let B be a set with m elements. Prove by induction that for every $n \in \mathbb{N}$ if A is a set with n element, then $A \times B$ has mn elements.
(3) Exercise 1.4.9. Hint: induction.
(4) Exercise 1.4.10 (only (i) and (ii)).
(5) Prove that, for all $n \in \mathbb{N}$

$$1^2 + 2^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$$

(6) Exercise 1.7.9
(7) Exercise 1.7.15 (only (i), (ii), (iii), (v)). Justify all your claims.
(8) Exercise 1.7.22