Homework 2 Due: Thursday, February 2

- 1. Read pp. 1-19 of the textbook.
- 2. Know the following:
 - (a) Definitions of arithmetic and geometric means.
 - (b) Stement and proof of Theorem 1.11 (Inequality of means).
 - (c) Statement and proof of Lemma 1.10.
 - (d) Statement of Theorem 1.14 (Second form of induction).
- 3. Do problems 1.5 (ii) and 1.8 on pp. 20-21.
- 4. Use mathematical induction to prove that $4^n + 15n 1$ is divisible by 9 for all positive integers n.
- 5. Prove that $\left|\frac{x}{y} + \frac{y}{x}\right| \ge 2$, where $x \ne 0$ and $y \ne 0$ are two arbitrary numbers.
- 6. Let the sum of the areas of the five faces of an open-top box be S. Find the maximum of the volume of the box (in terms of S).