MATH 341, ASSIGNMENT #2
DUE: WEDNESDAY, JANUARY 23, IN CLASS

Q1. Exercise A.4.2 on p. 415.

Q2. Exercise A.4.4 on p. 415.

Q3. If $a_n = \sum_{i=1}^{n} 1/i$, use induction to show that $a_{2^n} \geqslant n/2$.

Q4. Show that $\sum_{i=1}^{n} i^3 = (\sum_{i=1}^{n} i)^2$ for all n.

Challenge. Find all sequences (a_n) of nonnegative real numbers so that $\sum_{i=1}^{n} a_i^3 = (\sum_{i=1}^{n} a_i)^2$ for all n.

Q5. Exercise B.1 on p. 425.

Q6. Exercise B.2 on p. 425.

Q7. A sequence (a_n) is eventually decreasing if, after some initial terms, the sequence decreases. (For instance $(1, 0, 1, 2, 1, 1/2, 1/4, 1/8, \dots)$ is decreasing beginning at the fourth term.) Use quantifiers to express that (a_n) is eventually decreasing. Find the negation.

Q8. Let (a_n) be a sequence so that $a_n \in \{0, \dots, 9\}$ for each n. Express using quantifiers the statement that $a_1.a_2a_3a_4\dots$ is the decimal expansion of a rational number. (We write 1.3825, for instance, as the sequence of digits $(1, 3, 8, 2, 5, 0, 0, 0, \dots)$.)

Q9. Exercise 1.2.1 on p. 12.

Q10. Exercise 1.4.1 on p. 13.

Q11. Exercise. 1.6.3 on p. 13.