34. (a) Assume that "for all positive integers n, if n is greater than 4, then n^2 is less than 2^n is true. Use universal modus ponens to show that $100^2 < 2^{100}$.

(b) Prove the contradiction that if $3n+2$ is odd then n is odd.

(c) Use proof by cases to show that $n^2 \geq n$ for every integer n.

35. (a) Prove that every composite number can be expressed as the product of prime factors.

(b) If n is a positive integer and a is prime to n, prove that $a^{\phi(n)} \equiv 1 \pmod{n}$.

(c) Evaluate $\phi(5040)$.

$(2 \times 15 = 30)$