Section 6.2

6.24 Prove Bernoulli's Identity: For every real number $x > -1$ and every positive integer n,

$$(1+x)^n \geq 1 + nx.$$

6.26 Prove that $81 \mid (10^{n+1} - 9n - 10)$ for every nonnegative integer n.

6.30a Recall for integers $n \geq 2, a, b, c, d$, that if $a \equiv b \pmod{n}$ and $c \equiv d \pmod{n}$, then $a + c \equiv b + d \pmod{n}$. Use this result and mathematical induction to prove the following: For any $2m$ integers $a_1, a_2, ..., a_m$ and $b_1, b_2, ..., b_m$ for which $a_i \equiv b_i \pmod{n}$ for $1 \leq i \leq m$,

$$a_1 + a_2 + ...a_m \equiv b_1 + b_2 + ...b_m \ (mod\, n).$$