5.3.1b Find the remainder when $2(26!)$ is divided by 29.

5.3.04 Show that $18! \equiv -1 \pmod{437}$.

5.3.13 Supply any missing details in the following proof of the irrationality of $\sqrt{2}$: Suppose $\sqrt{2} = a/b$, with $\gcd(a, b) = 1$. Then $a^2 = 2b^2$, so that $a^2 + b^2 = 3b^2$. But $3|(a^2 + b^2)$ implies that $3|a$ and $3|b$, a contradiction.

5.3.17 If $p$ and $q$ are distinct primes, prove that for any integer a,

$$pq|a^{pq} - a^p - a^q + a$$