1. Let $x$ and $y$ be elements of a group $G$. Assume that each of the elements $x, y$ and $xy$ has order 2. Prove that the set $H = \{1, x, y, xy\}$ is a subgroup of $G$.

2. Prove that every integer is congruent to the sum of its decimal digits modulo 9.

3. Solve the equation $2x = 5$ modulo 9 and modulo 6.