1. Show that every integer $n > 11$ can be written as the sum of two composite integers.

2. Assume that $a, b$ are relatively prime positive integers. Show that $(a^2 + b^2, a + b)$ is either 1 or 2.

3. Show that if $k$ is a positive integer, then $3k + 2$ and $5k + 3$ are relatively prime.

4. Use the Euclidean Algorithm to find $(981, 1234)$ and express this as a linear combination of 981 and 1234.

5. Let $a$ and $b$ be positive integers. Show that there are positive integers $c$ and $d$ such that $c|a$, $d|b$, $cd = \gcd(a, b)$, and $(c, d) = 1$.

**NOTE:** Explain your work clearly. Your solutions must include enough detail to justify your conclusions.