MATH 356-01
Solutions to Homework Assignment 8

5.2 $17 \equiv 1 \pmod 4$, so 17 is a sum of two squares. In fact, $17 = 4^2 + 1^2 = (4+i)(4-i)$. Similarly, $53 = 7^2 + 2^2 = (7+2i)(7-2i)$.

5.3 $N(37+3i) = 37^2+3^2 = 1378 = 2 \cdot 13 \cdot 53 = (1+i)(1-i)(3+2i)(3-2i)(7+2i)(7-2i)$. We find that $1+i \nmid 37+3i$, but $1-i|37+3i$; the quotient is $17+20i$. Then $3+2i|17+20i$, and the quotient is $7+2i$, so we have $37+3i = (1-i)(3+2i)(7+2i)$.