Mathematics 216
Robert Gross
Homework 14
Due February 27, 2012

1. Suppose that a and b are roots of unity. Suppose that $o(a) = m$, $o(b) = n$, and $(m, n) = 1$. Prove that $o(ab) = mn$.

2. Find an explicit numerical example in which a and b are roots of unity with $o(a) = m$, $o(b) = n$, $(m, n) \neq 1$, and the order of ab is less than both m and n.

3. Prove that $A \cap B = B$ if and only if $B \subseteq A$.