

**Math 160a - Fall 2002**  
**Lloyd Kilford**

**Homework set 8**  
**Due: 28th November 2002**

1. Show that  $\mathbf{Q}(\sqrt{-10})$  has class number 2.
2. In this question, we consider ideals in the ring  $\mathbf{Z}[\sqrt{10}]$ . What are the inverses of the ideals  $(2, \sqrt{10})$ ,  $(3, \sqrt{10})$  and  $(5, \sqrt{10})$ ? Are these ideals principal?
3. Show that  $\mathbf{Q}(\sqrt{-163})$  has class number 1.
4. Let  $a^m - 1$  be a prime. Show that  $a = 2$  and that  $m$  is prime.
5. Let  $b^n + 1$  be a prime. Show that  $b$  is even and that  $n$  is a power of 2.