**Math 8201** **Homework 10** **PJW**

**Date due: November 18, 2002. There will be a quiz on this date.**

Hand in only the starred questions.

**Section 7.1** 1, 6, 7, 9, 10*, 11, 13, 14*, 15, 16*, 21, 24, 28*, 30

There are many good questions in the exercises at the end of this section.

II. Find a ring $R$ and elements $a, b, c$ all distinct from 0 such that $a \cdot b = a \cdot c$ and yet $b \neq c$.

JJ. Show that the quaternions $z$ for which $z^2 + 1 = 0$ are precisely those which may be written $z = bi + cj + dk$ with $b^2 + c^2 + d^2 = 1$.
[Hint: you may want to show as a first step that if $z$ satisfies the equation then $z = \pm\bar{z}$, and then go on to show that in fact $z = -\bar{z}$. Now continue.]

**Section 7.2** 2, 7*, 8