ABSTRACT ALGEBRA 2 - SPRING 2017 - ASSIGNMENT 6

1) Show that $\langle x \rangle$ is maximal in $\mathbb{Q}[x]$.

2) If $R \cong S$ as rings, show that $R[x] \cong S[x]$

3) How many distinct polynomials of degree 2 with leading coefficient 1 are there in $\mathbb{Z}_p[x]$, where p is prime?

4) [see (3)] How many distinct polynomials of degree 2 with leading coefficient 1 are there in $\mathbb{Z}_p[x]$ that factor into linear factors?

5) Suppose $I \subseteq R$ is a prime ideal for the commutative unital ring R. Prove or disprove: $I[x]$ is prime in $R[x]$.

6) Find the remainder when x^{51} is divided by $x + 4$ in $\mathbb{Z}_7[x]$.