Math 304 Homework 8

Your name goes here

Due November 9, 2018

Theorem O. Let $f(x) = a_0 + a_1x + \cdots + a_nx^n \in \mathbb{Z}[x]$ such that $a_n \neq 0$. If $r, s \in \mathbb{Z}$ such that $\gcd(r, s) = 1$ and $f(r/s) = 0$, then $r|a_0$ and $s|a_n$. [Hint: plug in r/s, clear denominators, and do some rearranging.]

Proof. □

Exercise P. Let F be a field. A polynomial $f(x) = a_0 + a_1x + \cdots + a_nx^n \in F[x]$ is called *monic* if $a_n = 1$. Find (with proof) all monic irreducible polynomials of degrees 2 and 3 in $\mathbb{Z}_2[x]$.

Solution: