Math 5320, 2/2/18 Name:

Worksheet 9: Integral domains, Euclidean domains

---

1. Show that cancellation works in integral domains: if R is an integral domain and $a, b, c \in R$ such that $ac = bc$, show that $b = c$.

2. Show that if R is an integral domain, the degree of the product of two polynomials $f(x), g(x)$ in $R[x]$ is the sum of the degrees of f and g. Find an example of a ring R that isn't an integral domain and some polynomials with coefficients in R that don't obey this rule!

3. Show that if R is an integral domain then so is $R[x]$.

4. Show that when you divide $f(x) = x^2 + \frac{1}{2}$ by $x - 3$ in $\mathbb{Q}[x]$, the remainder is the constant polynomial $f(3)$.

Check this box if you would like feedback ☐