Last name _____

First name _____

LARSON—MATH 591—CLASSROOM WORKSHEET 02

1. The integers $\mathbb{Z}$ are not a field. Explain.

2. Is $\mathbb{Q}$ a field? Explain.

3. What is the total degree of xyz?

4. Find a monomial in x, y, z with total degree 10.

5. x^α is a monomial in x_1, x_2, x_3, x_4 with $\alpha = (3, 4, 5, 6)$. Rewrite x^α in terms of x_1, x_2, x_3, x_4.

6. What is the total degree of x^α?

Let f be the polynomial $x^2 + 1$. For every field k, f defines a function $f : k \to k$ by $f(a) = a^2 + 1$, for every $a \in k$.

7. If $k = \mathbb{R}$, find $f(1)$.

Let $\mathbb{F}_2$ be the set $\{0, 1\}$ together with an operation '+' defined by $0 + 0 = 0$, $0+1 = 1+0 = 1$, $1+1 = 0$, and an operation '$\times$' defined by $0\times0 = 0$, $0\times1 = 1\times0 = 0$, $1 \times 1 = 1$.

8. If $k = \mathbb{F}_2$, find $f(1)$.

9. If $k = \mathbb{C}$, find a so that $f(a) = 0$.

10. If $k = \mathbb{R}$, find a so that $f(a) = 0$.

11. If $k = \mathbb{F}_2$, find a so that $f(a) = 0$.