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Math 521A: Abstract Algebra I

Homework Supplment

Problem 1: Multiply over the quaternions:

$$(x^2 + \mathbf{i}x + \mathbf{j})(x^2 + \mathbf{j}x + \mathbf{i})$$

Problem 2: Show using an example that the quotient remainder theorem does *not* hold in $\mathbb{Z}_4[x]$.

Problem 3: You might want to look up Pascal's triangle and the binomial theorem before doing this one.

- Compute $(x+1)^2$ in $\mathbb{Z}_2[x]$.
- Compute $(x+1)^3$ in $\mathbb{Z}_3[x]$.
- Compute $(x+1)^4$ in $\mathbb{Z}_4[x]$.
- Compute $(x+1)^5$ in $\mathbb{Z}_5[x]$.

Any ideas?