Test 2 for Honors Algebra IV Math 362

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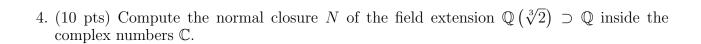
Instructions: The test is 60 minutes in length.

1. (20 pts) Assume \mathbb{F} is a subfield of the complex numbers, i.e. $\mathbb{F} \subset \mathbb{C}$. Assume $\sigma_1, \sigma_2, \sigma_3$ are three monomorphisms from $\mathbb{F} \to \mathbb{C}$. Assume we have the identity $\sigma_3(x) = 2\sigma_2(x) - \sigma_1(x)$ for all $x \in \mathbb{F}$. What can you say about these three monomorphisms. Explain.

2.	(10 pts) example	Write down an irreducible has the stated properties.	polynomial	which i	${ m s}\ { m not}\ { m s}{ m e}$	eparable.	Explain	why	your
	(10 pts) example	Write down an irreducible has the stated properties.	polynomia	l which	is not	normal.	Explain	why	your



(10 pts) Compute the Galois group and write down the Galois correspondence indicating on one side the subgroups of the Galois group and on the other side the corresponding subfields.



(10 pts) Compute the Galois group $\Gamma[N:\mathbb{Q}]$. Hint: You either can describe the Galois group in an explicit way or you can find it by some general arguments.

5. (20 pts) Let GF(1024) be the finite field of 1024 elements. Describe explicitly the automorphisms of the Galois group $\Gamma[GF(1024):\mathbb{Z}_2]$. Then work out the Galois correspondence indicating on one side the subgroups of Γ and on the other side the subfields of GF(1024).