

MA3A6 WEEK 7 ASSIGNMENT : DUE MONDAY 4PM WEEK 7

BILL HART

1. Find an arbitrary \mathbb{Q} -basis for $K = \mathbb{Q}(\zeta_5)$, where ζ_5 is a primitive 5-th root of unity and compute the discriminant of the \mathbb{Q} -basis you have found.
2. Prove that 7 is not a prime element in the ring $\mathbb{Z}[\sqrt{-5}]$.
3. Prove that if $11|\mathcal{N}(\alpha)$, for $\alpha \in \mathbb{Z}[\sqrt{-5}]$, then $11|\alpha$, and use this fact to prove that 11 is prime in $\mathbb{Z}[\sqrt{-5}]$.

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