Due Date: 19 April 2012, Thursday NAME:..

Ali Sinan Sertöz STUDENT NO:..

Math 431 Algebraic Geometry – Homework

previous	11	12	13	TOTAL
100	10	10	10	130

Please do not write anything inside the above boxes!

Q-11) Let R and S be connected Riemann surfaces with R compact. Show that every holomorphic map $f : R \to S$ is surjective. Show how it follows from this that there are no non-constant holomorphic functions on a connected compact Riemann surface.

Answer:

NAME: STUDENT NO:

Q-12) Let Λ be a lattice in $\mathbb{C}$ generated by ω_1 and ω_2. Define

$$g_2(\Lambda) = 60 \sum_{\omega \in \Lambda - \{0\}} \omega^{-4}, \quad \text{and} \quad g_3(\Lambda) = 140 \sum_{\omega \in \Lambda - \{0\}} \omega^{-6}.$$

Show that

$$g_2(\Lambda)^3 - 27 g_3(\Lambda)^2 \neq 0.$$

Answer:

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Q-13) Let Λ, $g_2(\Lambda)$ and $g_3(\Lambda)$ be as in the previous question. Let C_Λ be the projective curve in $\mathbb{P}^2$ defined by

$$y^2z = 4x^3 - g_2(\Lambda)xz^2 - g_3(\Lambda)z^3.$$

Once the curve C_Λ is known, described how to recover the lattice Λ.

Answer: