King Fahd University of Petroleum & Minerals
Department of Mathematical Sciences

MATH-533: Complex Variables I
Spring Semester 2004 (032)

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Homework # *6*

Due: Monday 24.5.2004

Q1. Show that the series $\zeta(z) = \sum_{n=1}^{\infty} n^{-z}$ converges for $\operatorname{Re} z > 1$, and represent its derivative in series form.

Q2. Prove that $\sum_{n=1}^{\infty} \frac{nz^n}{1-z^n} = \sum_{n=1}^{\infty} \frac{z^n}{(1-z^n)^2}$ for $|z| < 1$.

Q3. Express $\sum_{-\infty}^{\infty} \frac{1}{z^3-n^3}$ in closed form.

Q4. What is the value of $\sum_{-\infty}^{\infty} \frac{1}{(z+n)^2+a^2}$?

GOOD LUCK