

COMPLEX ANALYSIS – HOMEWORK ASSIGNMENT 7

Due Monday, March 24, 2014, at the beginning of class.

Please write clearly, and staple your work !

1. PROBLEM

Express

$$\sum_{n=-\infty}^{\infty} \frac{1}{z^3 - n^3}$$

in closed form.

2. PROBLEM

Evaluate the integrals

$$\int_0^{\frac{\pi}{2}} \frac{dx}{a + \sin^2 x} \quad , \quad |a| > 1$$

and

$$\int_0^{\infty} \frac{x^{\frac{1}{3}}}{1 + x^2} dx$$

3. PROBLEM

Prove that

$$\int_{-\infty}^{\infty} \frac{x \sin x}{a^2 + x^2} dx = \pi e^{-a} \quad , \quad a > 0$$

and

$$\int_0^{\infty} \frac{\ln x}{a^2 + x^2} dx = \frac{\pi}{2a} \ln a \quad , \quad a > 0.$$