

MATH 113 – PROBLEM SET #4

- (1) Problems from the book: *IV.3* : 5; *IV.4* : 1 (explain how you deduced the answer!), 3; *IV.5* : 3,4 .
- (2) TN Ch.8,XIII.6: Confirm by parametric evaluation that the integral of z^m (m any integer), round an origin-centered circle vanishes, except for $m = -1$.
- (3) TN Ch.9, V.1: If C is the unit circle, show that

$$\int_0^{2\pi} \frac{dt}{1 + a^2 - 2a \cos t} = \int_C \frac{i dz}{(z - a)(az - 1)}.$$

Use Cauchy's formula to deduce that if $0 < a < 1$, then

$$\int_0^{2\pi} \frac{dt}{1 + a^2 - 2a \cos t} = \frac{2\pi}{1 - a^2}.$$