MATH301-201 Homework 1 (due date: Jan. 20, 2016)

1. Compute the following contour integral

$$\int_{|z|=1} \frac{e^z}{\sin^3 z}\, dz$$

2. Compute the following integrals

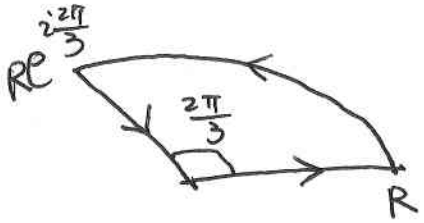
(a) $\int_0^{2\pi} \frac{d\varphi}{2+\sin\varphi}$

(b) $\int_{-\infty}^{+\infty} \frac{\cos x}{(1+x^2)^2}\, dx$

(c) $\int_{-\infty}^{+\infty} \frac{dx}{x^4+x^2+1}$

(d) $\int_0^{+\infty} \frac{dx}{x^3+1}$

Hint for (d): integrate over the circular sector



3. Compute the following integral with the contour given below

$$\int_C \frac{e^{2z}}{\cosh(\pi z)}\, dz$$

as $R \to +\infty$