

**Home work for the week of Oct 26. Due Nov 3.**

1. Find the partial fraction expansion for  $\frac{1}{\cos \pi z}$  and use it to show that

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \cdots$$

2. Calculate the residue at  $z = -n$  of the Gamma function  $\Gamma(z)$ .
3. Obtain the product expansion of the form  $\exp[g(z)]\Pi[(1 - \frac{z}{a_n})e^{\frac{z}{a_n}}]$  for the function  $F(z) = \sin \pi(z + \alpha)$  where  $\alpha$  is not an integer.