

Hw 13

Math 321

1.5

1. Find the radius of convergence for $\sum_{n=1}^{\infty} \frac{(z-1/2)^n 2^n}{(n^2+1)(2+1/n)^n}$
2. #4, #5

1.6

#2(interesting problem, you should do it) #4 #5

1.7+1.8

1. Write $1 + \sqrt{3}i$ and i in polar form. Then use these polar forms to calculate all the square roots of them.
2. Calculate $\ln(1 + \sqrt{3}i)$ and $\ln(i)$

(The following problems are more important)

2.1

Given $u(x, y)$ find the conjugate function $v(x, y)$ such that $u(x, y) + iv(x, y)$ is analytical (namely $u(x, y) + iv(x, y)$ can be written as a function $f(z)$ and $f'(z)$ exists in the domain we are interested in). Find $f(z)$.

- a). $u = x + y$
- b). $u = 2x^2 - 2y^2 + 2x + 3$
- c). $u = e^x \cos(y)$

3.1

1. #1 #5 #8 $\left((*)\#10\right)$
2. Calculate $\int_{|z|=2} \bar{z} dz$
3. $(*)$ (For smart guys) Calculate $\int_{|z|=1} \frac{\sin z}{z} dz$ and $\int_{|z|=2} \frac{\sin i}{z^2+1} dz$