

## Problems for HW 5

1. Use the nth term test to establish the divergence of the following series

(a)  $\sum_{n=1}^{\infty} n z^n$  for  $|z| \geq 1$

(b)  $\sum_{j=1}^{\infty} \frac{1}{(z-1)^j}$  for  $|z-1| \leq 1$

2. Use the ratio test to prove that the following series are absolutely convergent in the indicated domains

(a)  $\sum_{n=1}^{\infty} \frac{1}{n!} z^n$  for  $\text{Im}(z) > 0$

(b)  $\sum_{n=0}^{\infty} \frac{2^n}{(z-1-i)^{2n}}$  for  $|z-1-i| > \sqrt{2}$