

MATH 410, HW 6

1. Prove that

$$\binom{n}{0} = \binom{n}{n}.$$

2. Prove that

$$\binom{n}{k} = \binom{n}{n-k}.$$

3. Prove that

$$\binom{n+1}{k} = \binom{n}{k} + \binom{n}{k-1}.$$

4. Use the Lagrange Remainder Formula to prove the Binomial Expansion Formula

$$\forall \beta \in \mathbb{R}, \forall x \in [0, 1), \quad (1+x)^\beta = \sum_{k=0}^{\infty} \binom{\beta}{k} x^k$$

5. Prove that the Binomial Expansion does not converge for  $|x| > 1$ .