

# First Homework Assignment

8/25 1,3,5

8/27 9,13,19

8/30 21,37,45

Turn-in problems due 8/30: 4,8,10,16,24,30,40,42,44,48

★ **problem:** If  $a$  and  $b$  are elements of a ring, define  $[a, b] = ab - ba$  and inductively  $a^{(k)} = [a^{(k-1)}, b]$  (note that for the sake of simplicity we do not indicate the dependence of  $a^{(k)}$  on  $b$ ). Prove the following formula

$$\sum_{i=0}^k b^i a b^{k-i} = \sum_{j=0}^k \binom{k+1}{j+1} b^{k-j} a^{(j)}$$